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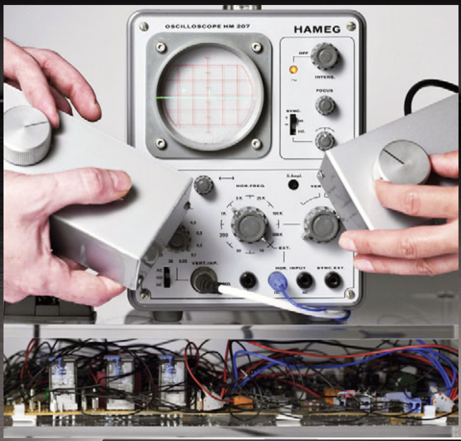

OLD-SCHOOL
THE HISTORY OF PC GAMING, PT.1

SNOW WHITE
& THE I7 CORES

THIS MOD PROVES PERFECTION IS NO FAIRY TALE

June | Vol. 13 Iss. 06
Complimentary Copy

Supports intel inside CORE

intel CHIPSET Z77 inside TAKE CONTROL

intel CHIPSET H77 inside MAXIMIZE ENTERTAINMENT

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JUNE 2013 | VOL 13 ISSUE 06

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Old Computer? Pass IT On For Good

Like most of us, you probably have an old computer or two that's seen better days but could still prove useful in the right situation. Enter Pass IT On For Good, a project from Obliterase and the University of New Hampshire's Research Computing Center that not only promises to securely destroy the data on a computer but also assess its readiness for donation for educational purposes. In short, the program provides a credit card-sized card with USB dongle built in. Upon plugging in the card, embedded software wipes the data and "streamlines the process of repurposing it for education or getting it into a certified stream for recycling." Better, you can pass the card on to others to use and track the total energy, water, and educational impact the efforts are making. The project's Kickstarter campaign was winding down at press time, but pledges of $25 or more netted donors a Bronze Pass good for use on five computers.

Cooler Master NotePal U2 Plus

If there is a dirty word among system enthusiasts, that word is "heat." As Cooler Master aptly states, heat is the "enemy." To combat the foe, the company has added another notebook cooler to its NotePal lineup in the form of the NotePal U2 Plus ($30), an aluminum- and metal mesh-constructed cooling pad that integrates two patented 80mm (2,000rpm) quick-release fans. Those fans draw power via the cooler's USB 2.0 port and can be repositioned at the user's discretion in order to match the specific layout of a given notebook so that airflow is best targeted at heat zones. Compatible with 17-inch notebooks, the U2 Plus also provides two loops to tidy up cables, comes in black or silver, weighs just 1.43 pounds, and when not in use folds up to serve as a protective carrying case.

WATCHING THE CHIPS FALL

Here is the pricing information for various AMD and Intel CPUs.

CPU	Released	Original Price	Last Month's Price	Online Retail Price*
AMD FX-8350 Eight-Core	10/23/2012	$195	$199.99	$189.99
AMD FX-8320 Eight-Core	10/23/2012	$169	$174.99	$174.99
AMD FX-8150 Black Edition Eight-Core	10/12/2011	$245**	$179.99	$179.99
AMD FX-8120 Black Edition Eight-Core	10/12/2011	$205**	$159.99	$159.99
AMD FX-6100 Black Edition Six-Core	10/12/2011	$165**	$119.99	$119.99
AMD A8-3870K Black Edition Quad-Core	12/20/2011	$135**	$99.99	$89.99
AMD A8-3850 Quad-Core	7/3/2011	$135**	$84.99	$84.99
AMD FX-4100 Quad-core	10/12/2011	$115**	$104.99	$99.99
AMD A10-5800K Quad-Core	10/12/2012	$122	$129.99	$129.99
AMD A6-3650 Quad-Core	7/3/2011	$115**	$81.99	$74.99
Intel Core i7-3970X Extreme Edition	11/12/2012	$999**	$1,049.99	$1,029.99
Intel Core i7-3960X Extreme Edition	11/14/2011	$990**	$1,069.99	$1,069.99
Intel Core i7-3930K	11/14/2011	$555**	$569.99	$569.99
Intel Core i7-3770K	4/23/2011	$332**	$329.99	$329.99
Intel Core i7-3770	4/23/2011	$294**	$289.99	$289.99
Intel Core i7-3820	2/12/2012	$305**	$299.99	$299.99
Intel Core i5-3570K	4/23/2011	$225**	$219.99	$219.99
Intel Core i3-3240	9/2/2012	$147	$149.99	$149.99
Intel Core i3-2130	9/4/2011	$138**	$129.99	$129.99
Intel Core i3-2120	2/20/2011	$138**	$124.99	$124.99

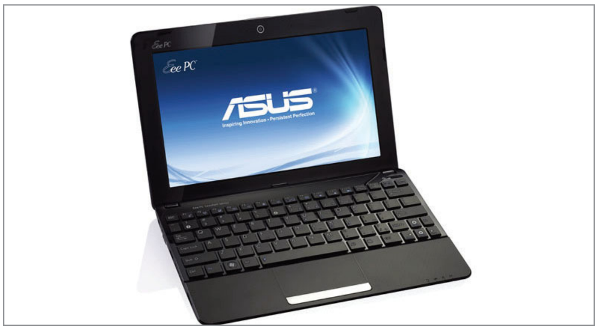
* As of Month Year
** Manufacturer's estimated price per 1,000

Doodle3D Brings 2D Drawings Into The Real World

The folks at Doodle3D want you to know that if you can hold a pencil, you can bring your 2D drawings to life via a 3D printer, all without requiring any knowledge of 3D design programs. The process involves creating a basic line drawing on a tablet, smartphone, or computer. Users can further alter the drawing's height and shape via a sculpting pane. Upon pressing Print, a connected 3D printer turns that drawing into a 3D plastic object within minutes. Rick Companje, co-founder of Netherlands-based Fablab Amersfoort, invented the Doodle3D software and is making it available via a Doodle3D Wi-Fi hardware box that connects to a printer and Wi-Fi network. The software runs on the device and is accessed via a web browser so that no installation is required. Doodle3D is making the Wi-Fi box available to early Kickstarter backers for $88, and shipping is expected to start in September.

$200 Touchscreen Notebooks? Intel Says It's So

During a mid-April conference call, Intel CEO Paul Otellini predicted that prices of touch-enabled, ultra-thin, Intel-based notebooks will dip "down to as low as $200." It wasn't clear what screen sizes Otellini was referring to, but tablets in the $200 realm generally hit 7 inches. Otellini and Intel CFO Stacy Smith indicated that Intel investors have various reasons to be optimistic about the future, including about affordable touchscreen systems running Intel's upcoming quad-core "Bay Trail" Atom processors. Otellini said Intel has a spec for ultrabooks that will be "centered as low as $599" and some SKUs as low as $499. He further stated that "if you look at touch-enabled Intel-based notebooks that are ultrathin and light using non-core processors, those prices are going to be down to as low as $200 probably." Time reported that while no one at Intel actually used the word "netbook," all the signs point to Intel referring to touchscreen netbooks. Bay Trail-based devices are expected by the holidays.



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XONAR U7
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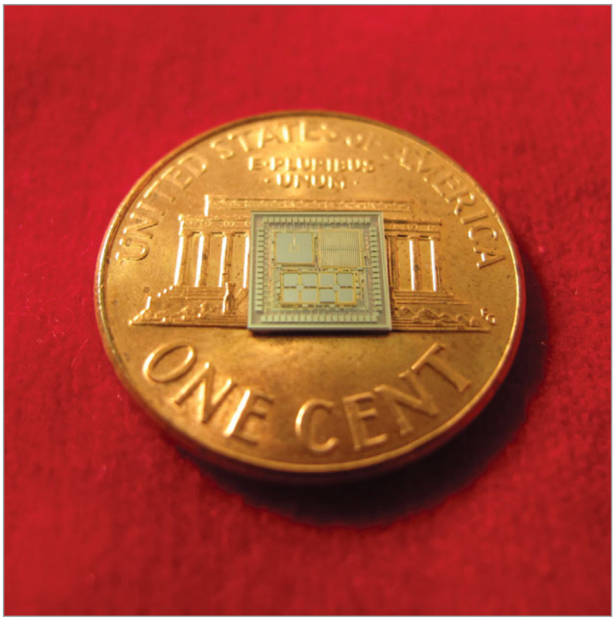
XONAR
Headphone AMP
Mic-in Control
114dB SNR
192KHz 24bit

ASUS Strums Up Xonar U7 USB Audio

If you own a premium set of gaming headphones and want to get the most out of them, ASUS believes it can help. Unlike some USB audio devices that can typically only support 5.1-channel audio due to power constraints, ASUS says its new USB-based Xonar U7 external soundcard device supports 7.1-channel (192KHz/24-bit HD) audio and "serves the needs of PC gamers who want to enjoy strong and clear sound via headphones." Beyond a headphone amplifier (32ohm to 150ohm), the Xonar U7 integrates a Cirrus Logic CS4398 DAC, supports Dolby Home Theater version 4, offers a signal-to-noise ratio of 114db, and benefits from ASUS' Hyper Grounding PCB construction that aims to reduce component crosstalk. The device includes a huge volume dial that also controls microphone volume and clicks to toggle between headphone and speaker functions. (Ports at the back include RCA and S/PDIF coaxial out options.) Pricing and availability are still to come.



DARPA Cooks Up GPS-Alternative Chip

What if, for reasons due to malfunction, enemy attack, or interference, GPS satellites suddenly became unavailable? Well, DARPA says, beyond the inconvenience to, say, drivers, the consequences could be “disastrous for military missions.” To that end, DARPA is working on a navigational chip that’s an alternative to GPS and is much smaller than navigation instruments systems now in use. The TIMU (timing and inertial measurement unit), which DARPA researchers at the University of Michigan are creating, possesses everything required to assist in navigation if GPS should temporarily fail. A single-chip TIMU prototype packs a six-axis IMU (three gyroscopes and three accelerometers) and master clock in a system smaller than a penny. DARPA says the chip can simultaneously measure orientation, acceleration, and time. Projected applications if GPS should become temporarily unavailable or limited include personnel tracking, handheld navigation, and guidance for small diameter munitions and small airborne platforms.

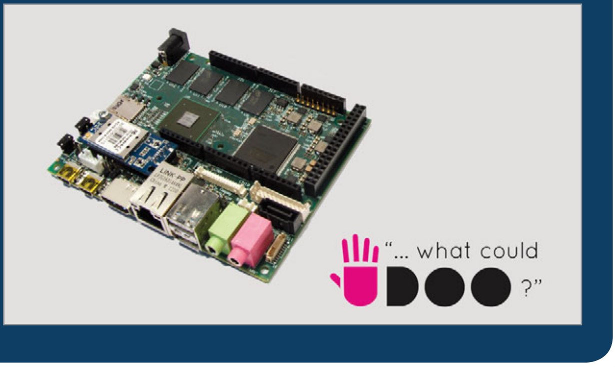
HARDWARE MOLE

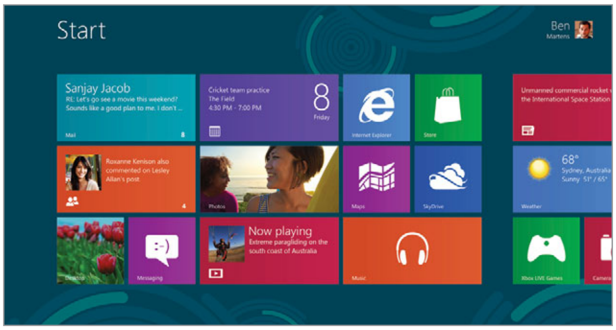
Inhon Sharpens Its Blade On Carbon

Meet the Blade 13 Carbon, a notebook that the Taiwanese maker hails as the world’s thinnest (10.7mm) and lightest (roughly 1.9 pounds). According to Engadget, despite the notebook’s svelte figure, the Blade 13 still includes an Intel Core i5 or i7 processor, a 128 or 256GB SDD, 4GB of RAM, and 1080p-quality screen. Reportedly, the cover and bottom plate feature carbon fiber construction while the palm rest is magnesium alloy. The complete package reportedly will cost buyers about $1,350 when the Blade 13 releases in Taiwan in June. A fiberglass, 1,600 x 900 version will cost $1,000. Elsewhere, Inhon also recently debuted its Carbon Tablet, a Windows 8-based unit that includes a base to prop the tablet up for notebook-like use but that also causes an internal cooling fan to crank up and spring the Intel Core i3, i5, or i7 processor inside into Turbo Boost speeds.

UDOO Does That Mini-Computer Voodoo

UDOO is an open-hardware, low-cost mini-PC that can switch between Android (4.0 Ice Cream Sandwich) and Linux (more specifically, Linaro) OSes via microSD card. It combines four Raspberry Pi boards + one Arduino Due. The result is a 4.33 x 3.35-inch unit that integrates an Arduino-compatible board and includes 1GHz ARM i.MX6 Freescale quad-/dual-core and Arduino Due ARM SAM3X processors, as well as a Wi-Fi module, mini USB connection, Ethernet jack, 1GB RAM, and HDMI out. UDOO says the board will provide users with a flexible environment to explore “the new frontiers of the Internet of Things” and is a “powerful prototyping board for software development and design.” UDOO’ enjoyed a successful Kickstarter campaign, and shipments are expected to begin in September with boards retailing for $109 or more.



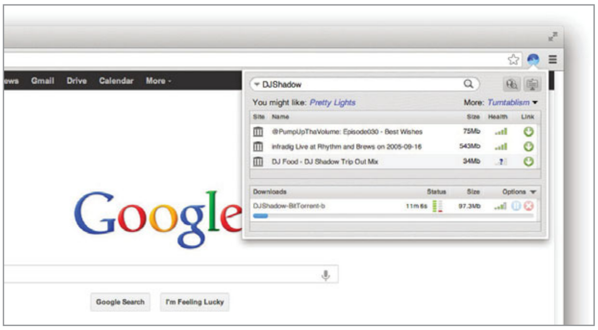

Start
Ben Martens
Sanjay Jacob
RE: Let's go see a movie this weekend?
Sounds like a good plan to me. I don't ...
Mail
8
Cricket team practice
The Field
4:30 PM - 7:00 PM
8
Friday
Internet Explorer
Store
Unmanned commercial rocket
the International Space Station
Roxanne Kenison also commented on Lesley Allan's post
4
Photos
Maps
SkyDrive
68°
Sydney, Australia
Sunny 51° / 65°
Weather
Messaging
Now playing
Extreme paragliding on the south coast of Australia
Music
Xbox LIVE Games
Camera

Welcome Back, Start Button?

If you were one of the many who cursed Microsoft when it kicked the beloved Windows Start button to the curb with the debut of Windows 8, rejoice. Tech site The Verge reported in late April that sources privy to Microsoft's plans informed the site that the Start button will indeed make its return with the release of Windows 8.1, possibly in the upcoming public preview version or the final version expected later this year. There is one caveat: According to The Verge, the button will only provide access to the Start Screen and won't actually come with the traditional Start menu. If 1.5 million-plus downloads of Pokki's Start menu replacement application (www.pokki.com) are any indication, the Start button's reappearance will be most welcome. The Verge also reported that Microsoft plans to give users the ability to "boot directly to the traditional Desktop environment in future builds of the upcoming Windows 8 upgrade."

BitTorrent Plugs Into Chrome & Firefox

After what started as a "little Chrome experiment" in January with the release of BitTorrent Surf Alpha, BitTorrent took its Surf browser plug-in to Beta status in mid-April, giving users Chrome and Firefox versions of the browser tool that's designed to make BitTorrent easier to use. As BitTorrent describes, Surf essentially "transforms your browser into a BitTorrent client, with discovery and downloading built in." In addition to a status window that enables viewing the status of file downloads, BitTorrent added a recommendation engine to Surf. The latter feature offers up content suggestions related to a user's searches, including BitTorrent Bundle suggestions. BitTorrent says that recommendations paired with prioritization abilities will assist in driving "visibility for BitTorrent partner artists," something that solves the "exposure barrier that every creator is confronted with."



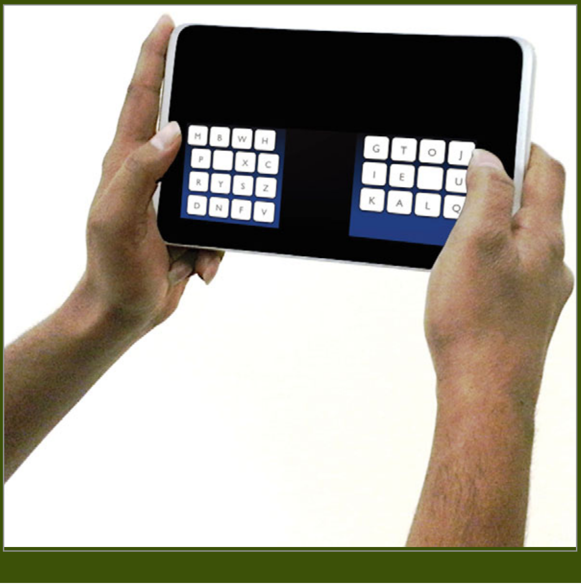
DJShadow

You might like: *Pretty Lights* More: *Turntablism*

Site	Name	Size	Health	Link
	@PumpUpThaVolume: Episode030 - Best Wishes	75Mb		
	infradig Live at Rhythm and Brews on 2005-09-16	543Mb		
	DJ Food - DJ Shadow Trip Out Mix	34Mb	?	

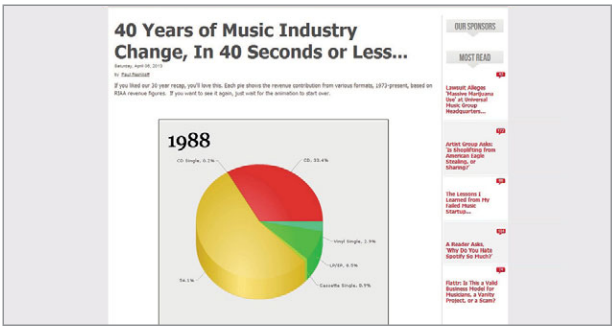
Downloads	Status	Size	Options
DJShadow-BitTorrent-b	11m 6s	97.3Mb	

SOFTWARE SHORTS



KALQ Is All Thumbs

With a little practice, a new virtual keyboard design that researchers at the Max Planck Institute for Informatics in Germany plan to release as a free Android app in May could help users type 34% faster than when using a QWERTY keyboard layout. In usage tests, the thumb-based, split-screen KALQ approach helped users reach a 37 words per minute rate following some training. According to the Institute, that's "the best ever reported for two-thumb typing on touchscreen devices," and far more than the 20wpm users typically achieve with a split-QWERTY design. The KALQ layout puts 16 keys on the left and 12 on the right, including all vowels other than Y. To benefit completely from using KALQ, the researchers trained users to move their thumbs simultaneously so that when one is typing the other is moving to the next letter. To arrive at their layout, the researchers used computational optimization techniques and thumb movement models to "search among millions of potential layouts."



40 Years of Music Industry Change, In 40 Seconds or Less...

If you liked our 20 year recap, you'll love this. Each pie shows the revenue contribution from various formats, 1973-present, based on RIAA revenue figures. If you want to see it again, just wait for the animation to start over.

1988
CD Single, 0.2%
CD, 33.4%
Vinyl Single, 2.9%
LP/EP, 6.5%
Cassette Single, 0.9%
54.1%
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Artist Group Asks: 'Is Shoplifting from American Eagle Stealing, or Sharing?'
The Lessons I Learned from My Failed Music Startup...
A Reader Asks, 'Why Do You Hate Spotify So Much?'
Flattr: Is This a Valid Business Model for Musicians, a Vanity Project, or a Scam?

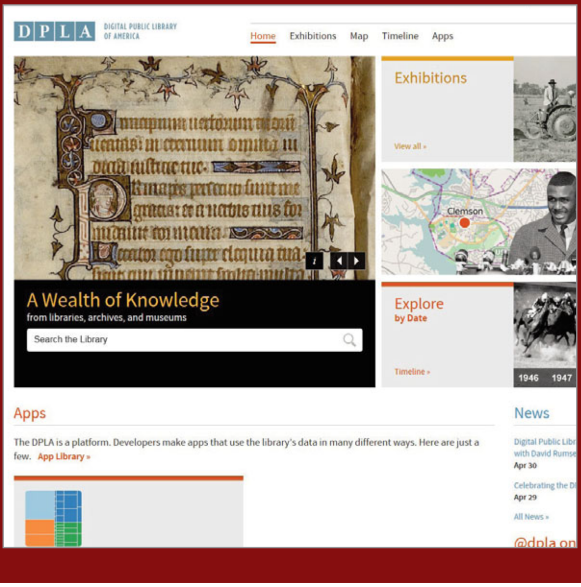
40 For 40

$177 million. That's how much business vinyl albums sales accounted for in 2012 globally. The total marks a 16-year high, according to stats the International Federation of the Phonographic Industry recently released. As nearly any music buyer with gray in his hair can testify to, however, things aren't like they used to be in the music world. A fascinating graphical display that Digital Music News put together depicts as much. Using U.S.-based shipments and revenue data from the RIAA along with individual pie charts representing 100% of total recorded music revenues for each year spanning 1973 to 2012, Digital Music News created one slowly looping visual to detail precisely how strong vinyl LP/EP sales gave way to strong cassette sales which gave way to strong CD sales which passed the torch to digital download sales over the decades. Whereas vinyl LP/EP sales counted for roughly 61% of music sales in 1973, for example, they totaled just 2.3% in 2012 while digital single and album downloads combined for 40%.

Japan ISP Scorches Users With Nuro

"Nuro." Just say the word out loud and it sounds fast, which is fitting considering it's the name of a newly launched fiber-based home Internet service in the Tokyo area that races along at 2Gbps download and 1Gbps upload speeds. Billed as the world's fastest broadband access for home usage, Nuro comes from So-net Entertainment, an ISP that Sony supports and that reportedly charges home and small-business users just roughly $51 per month with a two-year contract. Even with an installation fee totaling about $540, the charge seems a heck of a bargain considering Americans pay as much or more for far slower speeds. Google Fiber connectivity, for example, runs $70 per month for gigabit service. Better, So-net was offering the service free to those who applied online. Customers do have to rent an ONU (optical network unit), which converts the fiber connection to broadband Internet.

SITE SEEING



A Wealth of Knowledge
from libraries, archives, and museums

Search the Library

The DPLA is a platform. Developers make apps that use the library's data in many different ways. Here are just a few. App Library »

The Digital Public Library Of America Is Now Open

Perhaps the best way to describe what's waiting at the Digital Public Library of America, a recently launched beta "discovery portal and open platform," is to let the non-profit DPLA do it for us. More than two years in the making, the DPLA grants the public access to 2.4 million pieces of "materials found in American archives, libraries, museums, and cultural heritage institutions." The DPLA is "far more than a search engine," though; it also provides "innovative ways to search and scan through its united collection of distributed resources." This includes interactive exhibition, map, and timeline features. The distributed resources, meanwhile, come thanks to partnerships with six state and regional digital libraries and such institutions as the Smithsonian Institute, the New York Public Library, and Harvard University.

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3570 3.30Ghz	$ 579
3470 3.10Ghz	$ 565
3220 3.30Ghz	$ 495

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Nvidia® Geforce® 675MX 4GB Direct X 11 Video Card
8X DVD+-RW Rewriteable Drive
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Job Of The Month

The pluses: You get to work with the absolute latest, greatest technology and a highly motivated team of diverse, creative, and razor-sharp individuals, on "some of the world's most demanding and exhilarating high-tech engineering challenges." The minuses: All that cool stuff you'll be doing is top secret, so you won't be able to talk about it. Yes, the NSA (National Security Agency), that most secretive of secret agencies, is searching for computer and electrical engineers who want to conquer "challenges unavailable to the private sector." The NSA deals with all things involving communications, so let your imagination run wild. As for what they consider to be the perfect skill set, the NSA is (as usual) mum, but the minimum requirements are pretty mundane: a B.A. in Computer or Electrical Engineering (or a related field); at least a 3.0 GPA; strong written and verbal communication skills; and the ability to solve complex problems. We have no idea what the interview process is like, but we're guessing they may spend some time testing you on that last item. NSA headquarters are in Fort Meade, Md., and the agency says they will house you while they're interrogat . . . er, make that *interviewing* . . . you for the job.

(www.nsa.gov)

Newsflash:
Old Habits Die Hard

BBC World News and BBC.com commissioned a recent international study to find out which devices people in the digital age turn to for their news. The study focused on affluent people who owned devices representing at least three of four product categories: television sets, laptop or notebook computers, smartphones, and tablets. Survey results showed that most people in the selected demographic category still prefer to get their news the "old-fashioned way": on TV.

TV	42%
Laptops	29%
Smartphones	18%
Tablets	10%

Hoops & Tweets

Pro football may have supplanted baseball as America's pastime, but neither sport holds a candle to the NBA when it comes to social media. A survey by online ticket broker TIcketCity found that as a group, professional basketball teams attracted about twice as many fans or followers on Facebook and Twitter as did teams from the runner-up sport, professional football. (All numbers below equal millions of fans/followers.)

	Twitter	Facebook	TOTAL
NBA	7	16	23
NFL	4.55	7.1	11.65
MLB	2.83	4.5	7.33
NHL	1.7	2.7	4.4
NASCAR	1	3.3	4.3

RAW Numbers:

67%

The percentage of people who occasionally check their cellphones for messages or calls even though they haven't heard any ring or vibration alert.

Pew Research

800,000

The number of times larger in terms of storage capacity that Seagate's new 4TB hard drive is compared to the first desktop drive the company sold in 1979.

Seagate

1.2 million

The number of smartwatches that are projected to ship during 2013.

ABI Research

$1.6 billion

The value of the worldwide consumer robotics market in 2012.

ABI Research

Key Decisions

Fantastic New Gaming Keyboards

You've positioned yourself to ambush the competition, and when they turn the corner, you make your move. Of course, you take out the biggest threat, but now you're faced with his buddy, who's just come around the corner. It's time to pull out all your best moves, which means you'll be pressing a lot of keys in rapid succession, if not all at once. Today's high-end keyboards provide tactile feedback and speedy performance, so you'll know for sure that each attack is firing at the opponent.

In this roundup, we checked out a number of new keyboards designed for gamers and enthusiasts. Most of the models in this roundup are mechanical keyboards, which feel much different than those with rubber dome keyswitches. With a mechanical keyboard, the each key has its own switch that provides you with a certain tactile indication that you've pressed the key. Cherry MX switches are the most popular mechanical keyswitch, and there are five variants: Red, Black, Brown, Blue, and Green. In some cases, multiple versions of the same keyboard model will be available, each with a different type of Cherry MX switch, so enthusiasts can get the keyboard that provides the best feel, both tactile and acoustic, for them.

Vengeance K95

$149.99 | Corsair | www.corsair.com

Specs: Interface: USB; Cable length: 6.25 feet; Cherry MX Red mechanical keyswitches; 20-key rollover; Backlight: White, four brightness levels; Polling rate: 1,000Hz; Response time: 1ms; Wrist rest: Yes, detachable

Mechanical Differences

Keyboards with Cherry MX Blue and Green switches produce a tactile bump when the actuation point is reached (halfway down the key's total travel distance), and it also makes a loud "click" sound when released, so you'll know you've pressed the key. The Green switches have an actuation force of 80g, while the Blue have an actuation force of 50g. Some gamers prefer the "clicky" style of mechanical keyboards because they're able to hear when the switch actuates. Cherry MX Brown switches provide the same tactile bump as Blue and Green models, but there's no click sound, which is ideal for gamers and enthusiasts who prefer a quieter keyboard.

Cherry MX Red and Black keyswitches are similar in that neither type offers tactile or acoustic feedback. Rather, these linear switches offer a smooth feel that remains consistent through each up/down stroke. Some gamers believe that the MX Red/Black keys make it easier for situations where you need to double-tap the keys. The difference between the two types is the amount of pressure required to actuate the key. MX Black keys typically require a force of 60g, and MX Red keys require 45g. The lower resistance of MX Red keys means that some gamers find MX Red switches faster than the MX Blacks. Those who prefer MX Black switches argue that the additional force helps to keep you from accidentally pressing down keys.

Feature Sets

Most mechanical keyboards also come with extras that will ensure long-term comfort, such as a wide wrist rest, These customizable G-keys will execute your most frequently used macros and key combos, and Corsair designed the keys in three separate banks to let you group macros by function or organize them for most convenient access.

and reliability (some boast a life span of up to 50 million key presses), as well as tools for improving gameplay. People who play games that require several simultaneous key presses, such as FPS and strategy games, will want to look for antighosting or N-key rollover capabilities, as USB keyboards often have a functional limit to how many keys you can press at one time. Gamers who use keybinds should look for a keyboard with built-in memory and macro buttons where you can save common actions. Keyboards with built-in memory allow you to save profiles for different games, so you won't need to reprogram the macros when switching between games. Those who attend LAN parties or play in dark environments should consider a keyboard with LED backlighting under the keys, as you'll be able to differentiate the keys in low light.

Corsair Vengeance K95

The Vengeance K95 replaces the K90 as the flagship keyboard from Corsair. The mechanical keyboard is built with Cherry MX Red switches to provide you with smooth key presses at a low operating force, which is the preferred style for many gamers. Corsair also lets you completely customize the white LED backlighting, as each key is independently backlit. The Vengeance K95 boasts four levels of brightness. Corsair indicates that you can set up backlight patterns through profiles, so you can change the keyboard's lighting based on the different games you play.

Along the left side of the keyboard, you'll find 18 G-keys that you can program on the fly, or through the Vengeance keyboard gaming software. These customizable G-keys will execute your most frequently used macros and key combos, and Corsair designed the keys in three separate banks to let you group macros by function or organize them for most convenient access. Full anti-ghosting

Aivia Osmium

$129.99 | GIGABYTE | www.gigabyte.us

Specs: Interface: USB; Cable length: 6.5 feet; Cherry MX Brown or Red mechanical keyswitches; 64-key rollover; Backlight: Blue, custom brightness level is provided, thanks to dedicated diodes for each keyswitch. The Vengeance K95 supports 20-key rollover with a reporting rate of 1ms.

The chassis of the Vengeance K95 consists of an anodized black, brushed aluminum coating that contrasts nicely with the keyboard's bright white LED backlighting. The macros and lighting profiles can all be stored in the keyboard's internal memory, so everything will be same if you use the keyboard on a different PC. Three profile buttons can be found above the ESC key and first bank of function keys. Independent multimedia keys are located along the top right area of the keyboard; and there are controls for volume and video playback. The Vengeance K95 has a USB 2.0 port at the top of the keyboard near the braided cord.

We loved the feel of the Cherry MX Red switches when we tested the keyboard with our games, and the placement of the G-keys for macros put them easily with reach during the action. The customizable lighting is a fun feature that's great for showing off at LAN parties.

GIGABYTE Aivia Osmium

Osmium is known as the densest naturally occurring element, and GIGABYTE indicates that its "hard, rare, and noble nature" represents the durability and luxury of the keyboard. Just some of these lavish features include the choice between Cherry MX Red or Brown keyswitches, a USB 3.0 extension port, line out and microphone connections, and antighosting capability for up to 64 simultaneous presses when connected via USB.

Gamers who play MMO and RTS games will like that the Aivia Osmium lets you store up to five different profiles and can hold up to 70 macros. GIGABYTE includes its GHOST macro engine that lets you predefine macro keys, rather than having to manually capture and record them. The macro keys are located along the top row, above the Function keys. Next to the macro keys, you'll find two scroll wheels. One controls the brightness of the LEDs in the keys, and the other lets you adjust the volume.

The F1-F4 keys double as video playback controls, so you can play/pause, stop, rewind, and fast-forward content directly from the keyboard. A full-sized wrist rest is included to provide comfort for long gaming sessions, and there are additional feet stands to ensure the wrist rest stays in place. To connect to your PC, GIGABYTE provides a 6.5-foot-long braided cord that contains the two audio plugs, the USB 3.0 extension plug, and the USB 2.0 keyboard input—all of which feature 18K gold-plated connectors.

The Aivia Osmium sent to us featured Cherry MX Brown switches that provided a pleasant tactile feedback during our game testing. We also like that the Aivia Osmium offered an insane number of macros. Its ability to handle 64-key rollover via USB means that you won't need to have a PS/2 port on your motherboard to handle long, complex macros.

Corsair Vengeance K70

With Vengeance K70, it's easy to find the most common keys you press during games, as you can replace the WASD and numbered 1-6 keys with ruby red keys that are contoured and textured. Corsair also gives you the freedom to enable or disable the LED backlighting for each individual key on the keyboard. You can save your custom backlighting setup so that the keys' backlighting can change according to common RTS, MMO, and MOBA keybinds. Corsair built the Vengeance K70 with Cherry MX Red mechanical keys.

Corsair offers the Vengeance K70 in two color schemes: silver aluminum with blue backlighting and anodized black aluminum with a dark red backlighting. Corsair sent us the latter model for testing, and we found it offered an aggressive look, especially when we replaced some of the black keys with the red, textured keys. With each model, you can set the backlighting to four levels of brightness. Along the top of the keyboard,

Vengeance K70
$129.99 | Corsair | www.corsair.com
Specs: Interface: USB; Cable length: 6.25 feet; Cherry MX Red mechanical keyswitches; 20-key rollover; Backlight: Red or blue, four brightness levels; Polling rate: 1000Hz; Response time: 1ms; Wrist rest: Yes, detachable

you'll find buttons for the key-by-key customization, lighting level control, and Windows key on/off. There's also a mute button, volume roller and video playback controls.

The Vengeance K70 boasts 20-key rollover support over the USB interface. For quick response time and accurate input, Corsair engineers the keyboard with a 1,000Hz report rate. We noticed no key lag in our game testing, even in RTS games where we were holding down multiple keys at the same time. We also liked the inclusion of the textured keys, as it helped us quickly and easily find the key we needed.

Cooler Master CM Storm Trigger

The CM Storm Trigger is built with 64KB of onboard memory, and you'll find five macro keys along the left side of the keyboard. Each macro can contain up to 50 actions over the course of 30 seconds—with a maximum of 10 keys (six standard keys, in addition to SHIFT, ALT, CTRL, and WINDOWS) simultaneously, so it'll easily handle complex macro combinations for RTS and MMO games. You can store up to 15 macros for each profile. Cooler Master also smartly designs the CM Storm Trigger with a macro button on either side of the Spacebar for easy accessibility. You can quickly record a macro by holding down the CM Storm key and the ALT key for two seconds. Then, assign it to any of the five macro keys on the left hand side. As such, there's no need to leave the game to set up or configure macros.

Our review unit was built with Cherry MX Blue switches, but Cooler Master also provides Brown, Black, Red, and Green variants. You'll enjoy speedy reactions thanks to the CM Storm Trigger's 1,000Hz polling rate with a 1ms response time. The keyboard connects via USB and offers a 6-key rollover capability. For a solid grip and comfort, the keys have a non-slip rubber coating. A wide detachable wrist rest provides additional comfort. To enhance connectivity, Cooler Master provides two USB 2.0 ports on

CM Storm Trigger

$119.99 | Cooler Master | www.coolermaster-usa.com

Specs: Interface: USB; Cable length: 5.8 feet (detachable); Cherry MX Black, Blue, Brown, or Red mechanical keyswitches; 6-key rollover; Backlight: Red, three brightness levels; Polling rate: 1,000Hz; Response time: 1ms

CM Storm QuickFire Rapid

$99.99 | Cooler Master | www.coolermaster-usa.com

Specs: Interface: USB (PS/2 adapter included); Cable length: 5.8 feet (detachable); Cherry MX Blue, Black, Brown, or Green mechanical keyswitches; N-key rollover (with PS/2 adapter) the upper right side of the keyboard. There's also a 5V DC jack (power cable not included) that allows you to provide extra power to devices connected to the USB hub.

The CM Storm Trigger is visible is dark environments thanks to the red LED backlights. The backlights have five brightness levels, but you'll need additional power via the 5V DC jack for the highest two levels. There are also four backlight modes, so you'll be able to customize the LEDs to your gaming needs. You can choose between a fully lit keyboard; a setting where only the WASD, arrow keys, and macro controls light up; a breathing mode where the keyboard goes from dark to full brightness; and dim mode.

In our testing, we found the CM Storm Trigger delivered a nice mix of accuracy, comfort, and attractive design. The ability to quickly adjust the lighting and macros on the fly is something that will appeal to gamers, especially those who play many different games and in various types of lighting.

Cooler Master CM Storm QuickFire Rapid

The CM Storm QuickFire Rapid sent to us is built with Cherry MX Green keyswitches, which are similar to Cherry MX Blue switches; the Green switches are built to provide more resistance than the Blues. For almost zero lag, Cooler Master designs the keyboard with a 1,000Hz polling rate and provides a PS/2 adapter that allows for N-key rollover.

This keyboard is ideal for those traveling to LAN parties. Measuring 14 inches long and 5.3 inches wide, it'll fit easily inside a travel bag. You can use the extra desk/table space for and oversized mousepad. USB cable grooves in the back of the keyboard let you route the cable under the keyboard or tuck it away when you're on the go.

The QuickFire Rapid is built with laser-marked keycaps for crisp lettering, and Cooler Master adds a rubber-coated surface to give your fingertips a little extra traction. The Function key row provides you with a bevy of shortcuts for multimedia controls. You'll find play/pause, stop, rewind, fast-forward, mute, volume up, and volume down. The alternate function of the F9 key lets you disable the Windows keys, which Cooler Master has replaced with the CM Storm logo.

The CM Storm QuickFire Rapid lived up to its name in our testing, as the keys were responsive, and the extra resistance of the Cherry MX Green quickly popped the keys back up after they were pressed. There's also a satisfyingly loud click once we pressed a key. All in all, it's a good choice for LAN partygoers.

GX Gaming Imperator Pro

GX Gaming engineered the Imperator Pro for use with MMORPG and RTS games, as it provides you with six programmable macro keys and three game profiles, which let you program up to 18 macros. The macro keys themselves feature a more springy feel than the other keys and the programmable keys are lined up along the left side to make it easy to reach and find the macro you want to select. The three profile buttons are located on top of the keyboard above the F7-F10 keys.

The Imperator Pro features 18-key rollover, and GX Gaming designs the keyboard with a 1,000Hz polling rate and a 1ms response time for nearly instantaneous reaction to what you type. Another cool feature of the Imperator Pro are the backlit keys; you can customize the backlighting from a palette of 16 million colors, the same variety of colors that modern LCD monitors can display. For brightness, you can select among five levels: 33%, 66%, 100%, pause-break, and off.

At the top of the Imperator Pro, you'll find a set of multimedia controls located above the keyboard's F1-F5 keys. On the upper right side of the keyboard, you'll also find a two-port USB hub where you can plug a mouse or other USB peripheral. A palm rest in built into the bottom of the keyboard for comfort while gaming. To make long gaming sessions more comfortable, GX Gaming designed the Imperator Pro keys with a 3.8mm travel distance.

Imperator Pro

$89.99 | GX Gaming | www.gx-gaming.com

Specs: Interface: USB; Cable length: 5.9 feet; Rubber dome keyswitches; 18-key rollover; Backlight: 16 million RGB colors; Polling rate: 1,000Hz; Response time: 1ms

CM Storm QuickFire Stealth
$89.99 | Cooler Master | www.coolermaster-usa.com
Specs: Interface: USB (PS/2 adapter included); Cable length: 5.8 feet (detachable); Cherry MX Blue, Green, Brown, or Red mechanical keyswitches; N-key rollover (with PS/2 adapter)

GX Gaming includes its Scorpion Gaming utility, which made it easy to configure macros for our games. The rubber dome keys provided good feedback during our testing, and we liked how the macro keys were located near other keys that are frequently used for gaming.

Cooler Master CM Storm QuickFire Stealth

The CM Storm QuickFire Stealth is a mechanical keyboard with icons and letters painted on the front, rather than top, side of the keycaps. One of the key benefits is that the front-printed keys' lettering will last longer than normal keycaps, because you won't wear away the letters during use. When typing, was still easy to see the key labels at the angle from our desk, as it's printed in a large font. Gamers will also like that this keyboard is available with Cherry MX Blue, Green, Brown, or Red key switches. The model we tested featured Cherry MX Brown switches.

The CM Storm QuickFire Stealth is similar in style to the CM Storm QuickFire Rapid. The main difference is the location of the labels on the keys. Cooler Master designed the QuickFire Stealth with N-key rollover support via a PS/2 adapter. If you connect via USB, you'll get support for 12-key rollover. The QuickFire Stealth lets you adjust the repeat rate (must be connected via PS/2) using the F1-F4 function keys. You can choose between 1X, 2X, 4X, and 8X. To save space, Cooler Master eliminates the number pad, so the keyboard ends next to the arrow keys on the right side.

Along the Function key row, you'll find multimedia controls, as well as a key that disables the Windows keys. There's one Windows key on either side of the Spacebar. For convenience, the braided USB cable can be removed, and Cooler Master provides routing grooves along the side to ensure a solid connection during use. Red WASD keys are included, as well as a keycap puller, to let you replace these common keys for RTS and MMO games.

The Cherry MX Brown switches in this keyboard provided us with solid feedback, but very little noise. We also think that gamers will like the portability of the streamlined keyboard, as it's only 14 inches long and 5.3 inches wide.

Thermaltake Tt eSPORTS MEKA G1 Illuminated

This is another recent addition to the Tt eSPORTS' MEKA G1 lineup, and the Illuminated edition provides a pulse-break backlight system that offers seven different levels of red LED illumination. The backlighting control makes the MEKA G1 Illuminated the ideal choice for gamers who want a specific brightness level. This keyboard provides you with Cherry MX Black switches. Thermaltake

The MEKA G1 Illuminated's switches have a life span of 50 million keystrokes, and the keyboard features a 1,000Hz polling rate.

Tt eSPORTS MEKA G1 Illuminated

$84 | Thermaltake | usa.ttesports.com

Specs: Interface: USB (PS/2 adapter included); Cable length: 4.9 feet; Cherry MX Black mechanical keyswitches; N-key rollover (with PS/2 adapter); Backlight: red, seven brightness level; Polling rate: 1,000Hz; Wrist rest: Yes, detachable

Tt eSPORTS MEKA G1 PRIME Edition

$77 | Thermaltake | usa.ttesports.com

Specs: Interface: USB (PS/2 adapter included); Cable length: 4.9 feet; Cherry MX Brown mechanical keyswitches; N-key rollover (with PS/2 adapter); Backlight: No; Polling rate: 1,000Hz; Wrist rest: Yes, detachable

indicates that the high compression point helps to ensure error-free keystrokes.

The MEKA G1 Illuminated's switches have a life span of 50 million keystrokes, and the keyboard features a 1,000Hz polling rate. You'll also enjoy an integrated two-port USB hub (so you could connect a mouse and headset, for example) and audio I/O passthrough ports. Those who want to control their music and movies will like that the MEKA G1 Illuminated comes with seven multimedia keys. You'll find buttons for rewind, play/pause, stop, fast-forward, volume up, volume down, and mute.

There's a removable wrist rest and rubber feet on the bottom of the keyboard to help keep it in place when you're in the heat of the action and pressing hard on the keys. Using the included PS/2 adapter, all of the MEKA G1 Illuminated's 104 keys can be registered at one time. Thermaltake uses a braided cable with this keyboard for extra protection and to cut down on cable snags.

We felt like the Cherry MX Black switches certainly required more force than the Cherry MX Brown switches found on the MEKA G1 PRIME Team keyboard. That being said, key presses seemed smoother, as there was no tactile feedback. If you've narrowed your choices down to these two models, your gaming style will dictate which one works best for you.

Thermaltake Tt eSPORTS MEKA G1 PRIME Edition

As part of Thermaltake's Tt eSPORTS lineup, the MEKA G1 is targeted at gamers, and the PRIME Edition model has been designed with the Cherry MX Brown switches favored by PRIME—one of the top professional Starcraft II teams. Other PRIME-specific additions include bright pink colors for the most-used keys (the SHIFT, CTRL, ALT, ENTER, and number keys) in RTS games. You'll also find the PRIME Logo on the ESC key.

The board's Cherry MX Brown switches are rated for 50 million keystrokes, and a PS/2 adapter is provided to allow for antighosting capabilities on all 104 keys. If you opt for the USB connection, you'll have 6-key rollover at your disposal. The keyboard features a 1,000Hz polling rate, which Thermaltake indicates is a favorite of players. Other features include headphone and microphone passthroughs, an integrated two-port USB hub, a removable wrist rest, and seven multimedia function keys.

The Windows key has been moved from the left side to the right side of the Spacebar to help avoid accidentally kicking you out to the Windows environment during a gaming session. To give you in-game audio control, you can use the seven multimedia keys to adjust volume, or play/pause a song that's playing in the background. For durability, Thermaltake provides a thick, braided cable that protects the bundled USB and audio cables from damage. The cable measures almost 5 feet long.

The MEKA G1 PRIME Edition offers an enjoyable typing experience, as the keys provide sure feedback. The heft of the keyboard gives a sense of a solid design. Gamers who attend LAN parties will also like that the slim design makes this gaming keyboard a little more portable than the competition.

Thermaltake Tt eSPORTS Challenger Illuminated

This red LED-backlit keyboard from Thermaltake is built with membrane-style keys to meet the needs of gamers who prefer light-touch keys when gaming. The Challenger Illuminated also delivers a host of other extras to enhance the gaming experience, including six macro keys, three game profiles, red WASD and arrow replacement keys; and a built-in fan.

The Challenger Illuminated comes with 32KB of memory to store your game macros. You can switch between game profiles by holding down the FN key and pressing the F10, F11, or F12 keys. Pressing FN-F9 will restore your keyboard to the default settings. There are four levels of illumination, which you can control by pressing FN-SCROLL LOCK. The Challenger Illuminated's have a rubber-coated texture that's designed to give you greater control over key presses. For antighosting capabilities, the Challenger Illuminated supports 20 simultaneous key presses.

Thermaltake provides you with a keycap puller that makes it easy to switch out the WASD and arrow keys. Two blank, non-raised keycaps are also provided, in case you can to replace the cap on the Windows or other bottom row keys. Thermaltake also lets you disable the Windows keys. The Challenger Illuminated offers a polling rate of 500Hz, and there's a keystroke lifecycle of 10 million presses. To connect the keyboard, Thermaltake provides a gold-plated USB connector with a braided USB cable with a Velcro strap to keep the excess cable tidy.

Along the top of the keyboard, you'll find two holes for the detachable cooling fan, so you can opt to have a nice breeze directly over your game keys or a little farther away above the number pad. When not in use, the fan stows in a compartment on the left side of the keyboard. The F1-F7 function keys double as multimedia controls for both audio and video playback, and the Challenger Illuminated includes one USB port to let you connect a mouse or headset.

In our testing, we found that the keys on the Challenger Illuminated were certainly easy to press, very little pressure was required to actuate the keys. The fan is also a nice touch, as it helped to keep our palms dry while gaming.

Keynotes

For gamers who attend LAN parties, the Thermaltake MEKA G1 models and Cooler Master QuickFire models offer a variety of mechanical key-switch options in a minimal physical footprint.

The larger models in the roundup, such as Cooler Master's CM Storm Trigger, GIGABYTE's Aivia Osmium, Corsair's Vengeance K95, and the GX Gaming Imperator Pro, are built with smart macro keys that give you plenty of options to configure and utilize multiple keybinds. Those who play RTS and MMORPG games should opt for take a long look at these boards' macro capabilities and consider which one fits them best. ■

BY NATHAN LAKE

Tt eSPORTS Challenger Illuminated

$37 | Thermaltake | usa.ttesports.com

Specs: Interface: USB; Cable length: 6.6 feet; Membrane keyswitches; 20-key rollover; Backlight: Red, four brightness levels; Polling rate: 500Hz

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Dominator Platinum modules shown with the **Light Bar Upgrade Kit**

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www.thermaltakeusa.com

Thermaltake Urban S41

In our travels, when we encounter a PC case, we typically see one of two design philosophies implemented. There's the bold, brash, and unrepentantly wild: front panels with aggressive accents, brilliant LED fans, and a case window to show off your system's impeccable interior. Then you have cases that make a loud statement through their subtlety: a brushed aluminum finish here and there, clean lines, and lots of substance. Thermaltake's Urban S41 is decidedly the latter, done to near perfection.

A brushed aluminum front panel door says, "Hello." The door, which is magnetically secured to the chassis, opens with a slight pull and stays firmly secure when you shut it. The top of the front panel is the home of the Urban S41's I/O ports (a 2.5/3.5-inch drive dock resides on the top panel), including two USB 2.0, line out and mic jacks, and two USB 3.0 ports that cable to a motherboard's internal headers. An LED bar above these ports gives just the right amount of visual flair.

Inside, it's quite obvious that this isn't Thermaltake's first rodeo. A quartet of rubber-grommeted cable management holes take up a perimeter along the right side of the motherboard tray, so you can route cables precisely where they're needed and keep the excess out of sight. Also, we noticed there are a couple of precut holes at the top of the motherboard tray between the tray and right side panel, which lets you sneak an EPS12V CPU power cable behind the motherboard tray rather than draping it across your build components. That's the mark of refinement we look for in a case.

Your cooling is largely taken care of right out of the box, as the Urban S41 includes two 120mm fans (one front, one rear) and a big, bad 200mm fan on the top panel. Thermaltake has given this a ton of thought, too. The dust filters that correspond with the front and top panel fans are extremely easy to remove (as is the bottom panel filter for your PSU and an optional 120mm fan), and the foam padding on the Urban S41's left and right side panels can reduce your acoustic footprint by a considerable margin. The case also gives you the flexibility to install a 120 or 240mm liquid-cooling radiator; Thermaltake's family of Water 2.0 closed-loop CPU coolers will be happy to oblige if you're so inclined. Regardless of the CPU cooler you choose, the cutout on the motherboard tray is positively enormous and makes installing a CPU cooler's backplate a trivial matter.

Graphics cards up to 12.4 inches long are supported with all of the Urban S41's drive cages in place, but if you need more room, you can remove one (or both) 2.5/3.5-inch cage for another 4.7 inches of clearance. While we're on the subject of drive bays, the tool-less locks (5.25-inch bays) and trays (2.5/3.5-inch bays) are done very well.

If you're in the market for a new case or you're getting ready to build a new system, Thermaltake's Urban S41 is the type of chassis that gives you instant street cred. For the price, it's about as clean and complete as we've seen in a long time.

BY VINCE COGLEY

Specs: Dimensions: 20.3 x 8.7 x 20.5 inches (HxWxD); Motherboard support: ATX, mATX; Bays: 3 5.25-inch external, 1 3.5/5.25-inch external, 5 2.5/3.5-inch internal, 1 2.5/3.5-inch external dock; Fans (included): 1 120mm front, 1 120mm rear, 1 200mm top; Fans (optional): 1 120mm bottom; Ports: 2 USB 3.0, 2 USB 2.0, audio I/O

NiC C5
$54.99
Thermaltake
www.thermaltakeusa.com

Thermaltake NiC C5

One of the biggest issues with high-performance heatsink/fan CPU coolers is that when you include the large fins and cooling fans, they often extend over your motherboard's DIMM slots, which can make your memory and CPU cooler incompatible together. The NiC (short for non-interference cooler) lineup from Thermaltake aims to solve that issue by using 6mm U-shaped copper heatpipes that can more effectively dissipate heat than traditional heatpipes, which allows Thermaltake to use a slim tower of aluminum fins and still provide high-performance cooling. The NiC C5 is the flagship in the NiC lineup, and it comes with five heatpipes and two 120mm, VR-controlled fans that operate from 1,000 to 2,000rpm.

Including the fan shroud, the NiC C5 is a mere 3.5 inches wide. But you still get high-end cooling thanks to the NiC C5's 6-inch height. Thermaltake indicates that the aluminum fins have been specially designed with a curved shape that reduces back air resistance and maximizes flow through the fins. The fins themselves are 0.4mm thick. With the NiC C5, you'll be able to manually control the 120mm fans using the built-in speed knob, which is located near the three-pin power connector. The fans can move up to 99.1cfm of air and have a noise range between 20 and 39.9 dBA. Thermaltake indicates that the NiC C5 can deliver up to 230 watts of cooling power.

The NiC C5 is compatible with current and upcoming processor sockets. For Intel, there are universal brackets for LGA775/1150/1155/1156/1366/2011. For AMD, you'll find support for AM2/AM2+/AM3/AM3+ and FM1/FM2.

When installing the cooler, you'll need to start by removing the fan shroud. It's easily removed by pulling on the tabs on the side of shroud. Then, you'll just attach the backplate by inserting screws into the backplate and hand-tightening a bolt to secure the backplate. Next, you attach the appropriate mounting bracket to the heatsink and install it onto the remaining threads above the bolts. Once screwed down, you're ready to add the fans.

Our test system included an Intel Core i7-3770K, two ZOTAC GeForce GTX 580s in SLI, and 16GB of Kingston's HyperX Predator DDR3-1866. We ran at the processor at its stock clock for 30 minutes in idle, and it delivered a temperate of 32 degrees Celsius. To stress-test the CPU cooler, we ran two separate tests for 10 minutes: POV-Ray 3.7 Beta and four instances of Prime 95's Small FFTs test. Both tests hovered at a maximum temperature of 64 C, which are impressive numbers for such a small heatsink/fan combo.

If you're investing in high-performance memory modules with tall heat spreaders, the NiC C5 is an ideal option. It delivers great performance and ensures that you'll be able to use the speedy memory.

BY NATHAN LAKE

Specs: Materials: Copper (base, heatpipes), aluminum (fins); Fans: 2 120mm (1,000 to 2,000rpm); Dimensions: 6.3 x 5.9 x 3.5 inches (HxWxD); Warranty: 2 years

Test system specs: Processor: Intel Core i7-3770K; Motherboard: GIGABYTE Z77X-UD4H; GPU: ZOTAC GeForce GTX 580 (2x, SLI); RAM: 16GB Kingston's HyperX Predator DDR3-1866; Storage: 128GB Crucial RealSSD C300; OS: Windows 7 Enterprise (64-bit)

Overhaul Your Arsenal

Get Your System Ready For Haswell

As we go to press, Intel is prepping the next phase in the evolution of its Core processors, code-named "Haswell," for launch. If your system is getting a little long in the tooth, then you've probably circled June 2nd on your calendar in red. Now that we're just a few short weeks from the launch, it's time to start putting your upgrade plans into action. In this article, we'll give you an in-depth overview of what you can do now to prep your system for a Haswell transplant.

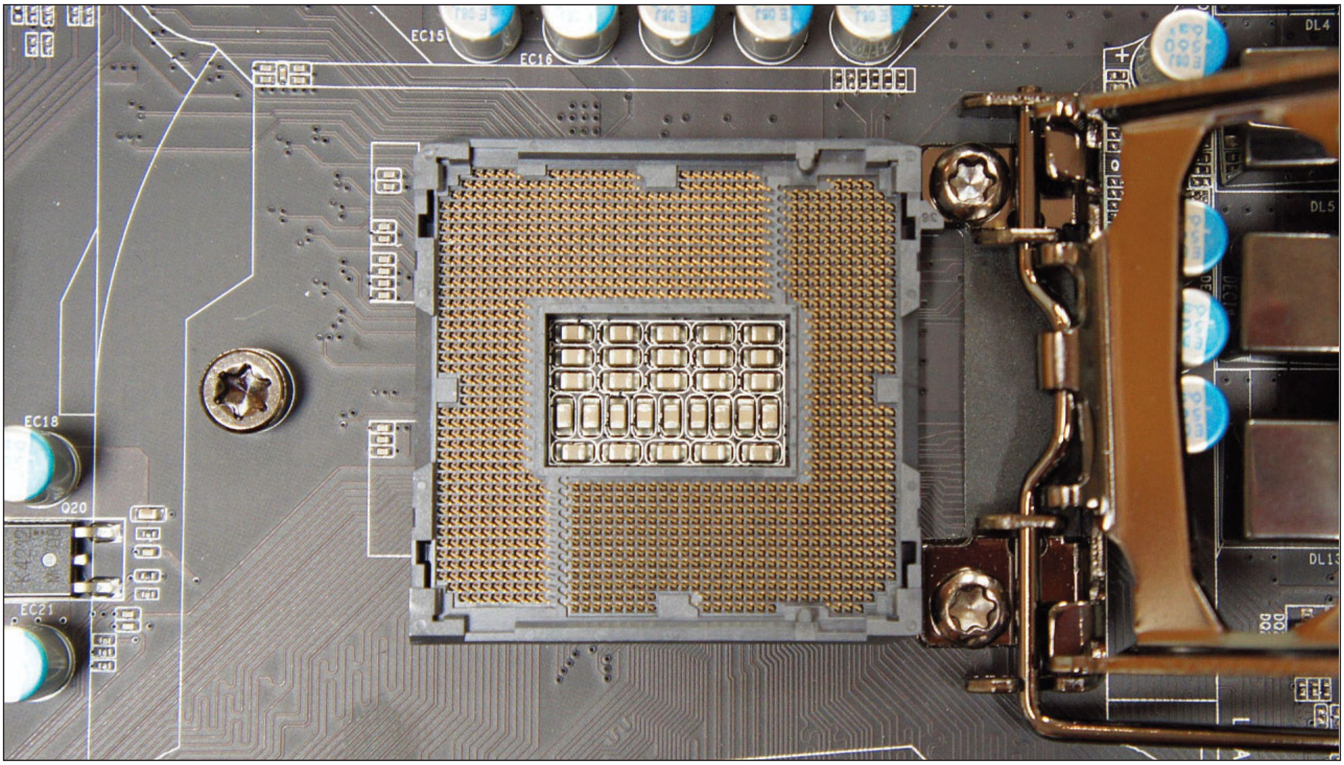
From The Ground Up

Haswell is the "tock" portion of Intel's "tick-tock" product cycle. We're talking a whole new architecture, but the same 22nm process that Ivy Bridge debuted on. In addition to several new desktop CPUs, which almost certainly will include some overclockable K Series procs, Intel is introducing a new socket with the platform. You know what that means; a new motherboard will be necessary to enjoy Haswell's benefits. In all but a few limited circumstances, a new motherboard and CPU require a fresh OS install. We can't think of a better excuse to rebuild your computer from the ground up. In the following sections, we'll explore the factors to keep in mind when considering parts for your new computer.

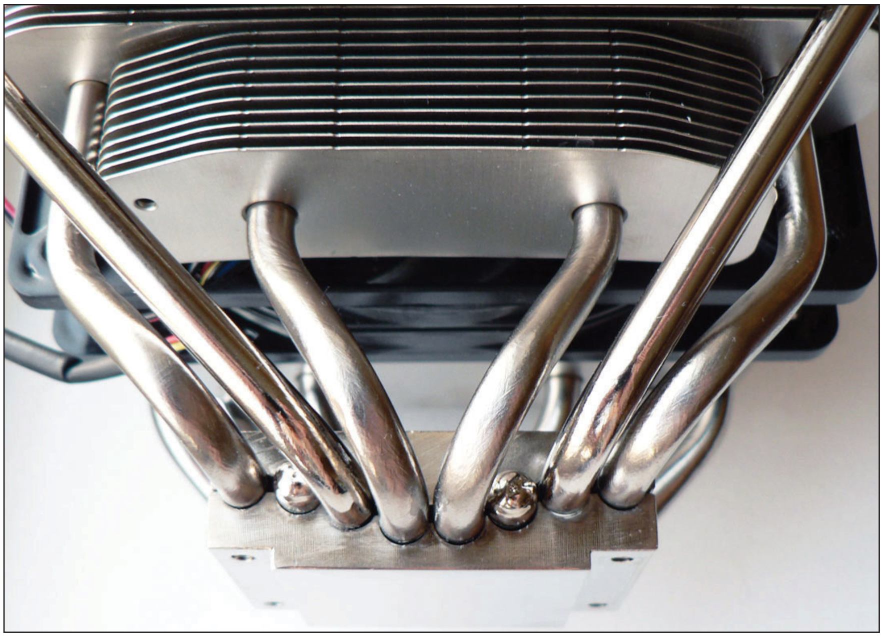
Motherboard

There's no question here, you'll need a new motherboard. Haswell marks Intel's first processor built using FinFET transistors, which are designed to be significantly more power-efficient than Ivy Bridge's transistors. As such, the CPU socket for Haswell-DT (desktop) processors is different; it uses an LGA1150 socket instead of the LGA1155 socket Ivy Bridge and Sandy Bridge shared.

If it's been a while since you upgraded, and you're still on the fence as to whether Haswell will be worth the expense, consider that your next motherboard is more than the sum of its CPU features. Haswell motherboards will undoubtedly ship with a bunch of advanced technologies. Haswell's Lynx Point chipset will reportedly support up to six USB 3.0 ports and up to six 6Gbps SATA III ports. Until products launch in June, we won't know for sure whether motherboards



Intel's Haswell processors won't slot into your LGA1155 motherboard, which means it's time to upgrade.



Aftermarket CPU coolers, like this one from Cooler Master, can handle high overclocks on K Series Core processors.

will support everything in the chipset, but chances are third-party motherboard manufacturers will supplement these capabilities with additional ICs. Other features you might expect to enjoy with an upgrade include one or more eSATA ports, one or more Thunderbolt ports, a UEFI BIOS, PCIe 3.0, built-in multichannel audio, and a Gigabit Ethernet controller.

Intel 8 Series motherboard form factors are not currently known, but it's safe to assume there will be both ATX and mATX variants available at launch. Intel has stated that Haswell-H series processors will be targeted for Mini-ITX motherboards, but these may not be available at launch.

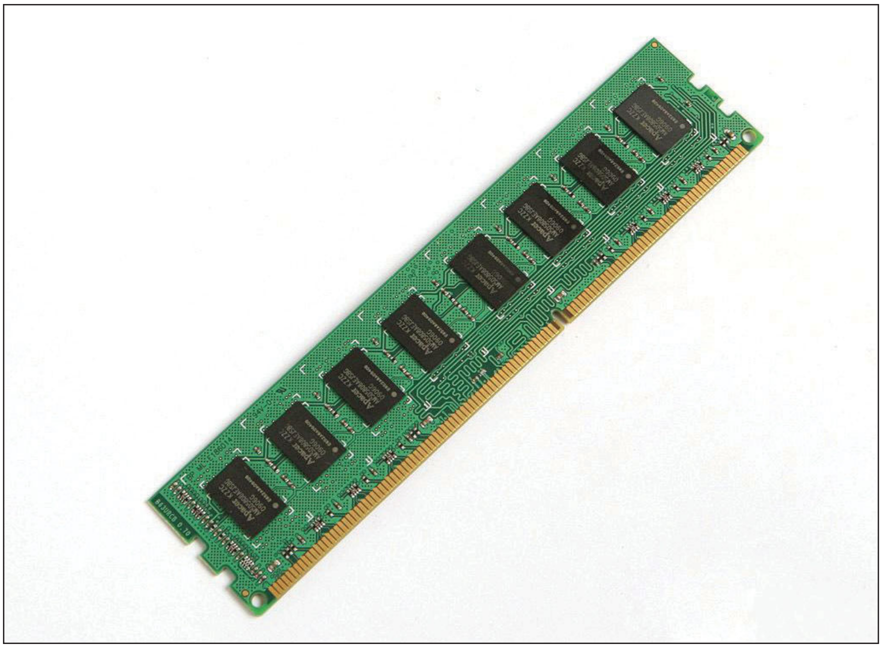
When thinking about your motherboard upgrade, it's important to factor in Intel's new BGA strategy. According to the firm, every other generation's first processors will be permanently soldered onto the motherboard. The next step in Intel's processor roadmap after Haswell, code-named "Broadwell," will only be available in BGA (ball grid array; a socket type where the CPU is permanently soldered in place) motherboards. Desktop Haswell is primarily a socketed platform, but there will be at least one BGA unit, and it'll carry the R suffix. If you choose this part, your motherboard choice has been made for you. Enthusiasts may balk at this, but some sources are reporting that the upgraded GT3e integrated graphics core (most likely the best-performing GPU accompanying any of the Haswell SKUs) will only be available in the BGA model. If you plan to run discrete graphics, like most users interested in high-end gaming, then this isn't an issue.

CPU Cooler

You may love that aftermarket block of aluminum and copper or the closed-loop liquid cooler you have on your current rig, but new sockets often come with new CPU cooler mounts. We don't know for sure if your Sandy/Ivy CPU cooler will be made obsolete by Haswell, but there's a chance it might, so it's a good idea to set aside some money for a new cooler. If you plan to buy one of the K-series SKUs Intel plans to launch, then set aside a little more to get a cooler capable of dissipating more than desktop Haswell's 95W TDP. According to Intel, the overclocker-friendly processors will have ratios of up to 80, with a 100MHz BCLK, that's up to 8GHz, but you're probably going to need LN2 to manage such a feat.

Memory

All indications are that Haswell probably won't support more than dual-channel



Haswell processors feature on-die DRAM voltage regulators.

memory in the IMC. If you already run a DDR3 kit, it'll probably work just fine in Haswell. That being said, memory overclocking will see incremental improvements under the new platform. Intel has indicated that Haswell will offer 200MHz steps and 266MHz steps, for data rates up to 2.6GHz and 2.66GHz, respectively. A maximum memory frequency of 2.93GHz will also be possible. If you perform a lot of memory-constrained operations, then it may be worthwhile to upgrade to some of the higher-clocked memory kits that will become available following Haswell's launch.

Your PCIe graphics card will work with your new Haswell motherboard.

Graphics Card

Depending on what you use your computer for, your graphics options may vary greatly. Those of us who value fast frame rates, high resolutions, and lots of in-game eye candy probably already have a very capable graphics card. Either NVIDIA GeForce GTX 600- or AMD Radeon HD 7000-series graphics cards will work with Haswell. These GPUs are all compatible with PCIe 3.0, which is on par with Haswell's integrated PCIe controller. Like Ivy Bridge, Haswell will support multi-GPU configurations, up to three-way for both NVIDIA SLI and AMD CrossFireX. Even older graphics cards will still work in the PCIe x16 slots of the desktop Haswell boards, but if your GPU isn't at least DX11, now's a good time to invest in something new.

Haswell includes on-die graphics, so your entry-level discrete graphics card may be utterly outclassed by Haswell's beefed up graphical muscle. Intel claims that Haswell's top-tier processor graphics engine is up to twice as fast as Ivy Bridge's integrated HD4000. Intel has also indicated that Haswell will have on-package voltage regulation and tweakable GPU ratios on some of the SKUs. If you plan to overclock your GPU, make sure you factor that into your CPU cooler budget.

If you're not sure if you want to stick with Intel's integrated graphics engine or go discrete, then consider that Intel's projected performance targets for Haswell's high-end processor graphics are on par with NVIDIA's GeForce GT 650M, which is a discrete graphics chip used in current notebooks.

One or more SSDs can really improve your PC's response time on a number of fronts.

Storage

Whether you run a mechanical hard drive, SSD, or a combination of the two, there's no reason you need to replace those to use them effectively on Haswell. If you have yet to move to SSDs, Haswell is a good place to start. According to Intel, Lynx Point includes a special set of performance and power optimization instructions, code-named "Lake Tiny," tailored for SSDs.

Power Supply

If you're currently running a Sandy/Ivy Bridge platform, then your current power supply should be more than adequate to handle the load. Haswell is even more power efficient than the previous Core processors, but overclocking a K Series SKU will likely obliterate any power savings you plan to get from the system.

As long as you're upgrading everything else, however, you might consider getting a more energy-efficient PSU. For instance, a 1000-watt unit in a multi-GPU rig will suck wildly varying amounts of power depending on what you're doing with it. With all PSUs, the efficiency rating decreases proportionately with the load percentage. At 50% load (your PSU's most efficient output), you won't be wasting as much energy. But if you do plenty of Web browsing or document creation on your gaming rig, then you are paying for energy that Haswell just doesn't need. An 80 Plus Silver, Gold, or Platinum PSU will ensure you're not paying for too much more energy than your new rig can consume.

Case

As stated above, Haswell motherboards will likely come in a variety of form factors, including ATX, mATX, and Mini-ITX. A vast majority of cases support standard ATX motherboards and the two smaller form factors, as well. Your current case will likely fit them too, but you could use the opportunity to scale down your case if you decide to go with a mATX or Mini-ITX Haswell board. Other reasons to consider a case upgrade include native USB 3.0 ports on the front panel, internal space for a closed-loop liquid cooling system (to support that K Series SKU), and a plethora of SSD mounts.

Monitor

Of all the components listed here, you might find the monitor the least justifiable upgrade. But with chipset-level Thunderbolt support, you can see how a new monitor (or two or three or four) might take your new system to the next level. Even a DisplayPort monitor would be a worthwhile upgrade, and while they're at it, gamers and media enthusiasts shouldn't pass up the opportunity to get a 1,920 x 1,080 or higher resolution display make sure to get the most out of games and HD content.

Overclocking

The Haswell chip you get will be either locked or unlocked (K Series). If you go with the latter, you'll get full access to the BCLK and multiplier, as well as some new voltage tweaks thanks to a newly integrated voltage regulator. Haswell gives you access to a pair of input voltages, VCCIN for logic and VDDQ for DRAM, the latter of which depends on the DRAM type installed in your system. If you want to hit some truly impressive numbers, you'll need to make sure your system is thermally capable. We already mentioned the need for an aftermarket CPU cooler or closed-loop liquid cooler (a fully custom liquid-cooling system is a good choice, as well). Also take into account the case cooling. If you have an open-shrouded video card heatsink, your system's internal temperatures will be higher than otherwise. One or more side panel fan(s) can alleviate the heat, but well-routed wiring can be just as effective.

Now is a good time to consider an upgrade to a more efficient PSU.

Stay On The Cutting Edge

We know it's a lot of work keeping up with the latest hardware, which is why we take our job so seriously. Haswell is shaping up to be one of those watershed moments in computing, where performance makes a dramatic leap ahead and power consumption drops back. If it's been a while since you upgraded, we can't think of a better opportunity than this to bring your system up to speed. ■

State-Of-The-Art Standards

SATA 6Gbps

SATA (Serial Advanced Technology Attachment) is a mass-storage interface that has evolved to keep in step with advancing technologies. It has since become the primary internal optical drive and storage interface used in modern computing, and SATA III, or SATA 6Gbps, or SATA Revision 3.x is the latest version of the specification. Read on to find out how the standard evolved, why there's so much fuss over what to call the latest iteration, and where it's heading next.

SATA technology debuted on mechanical hard drives, but it wasn't until SSDs came along that SATA really took off.

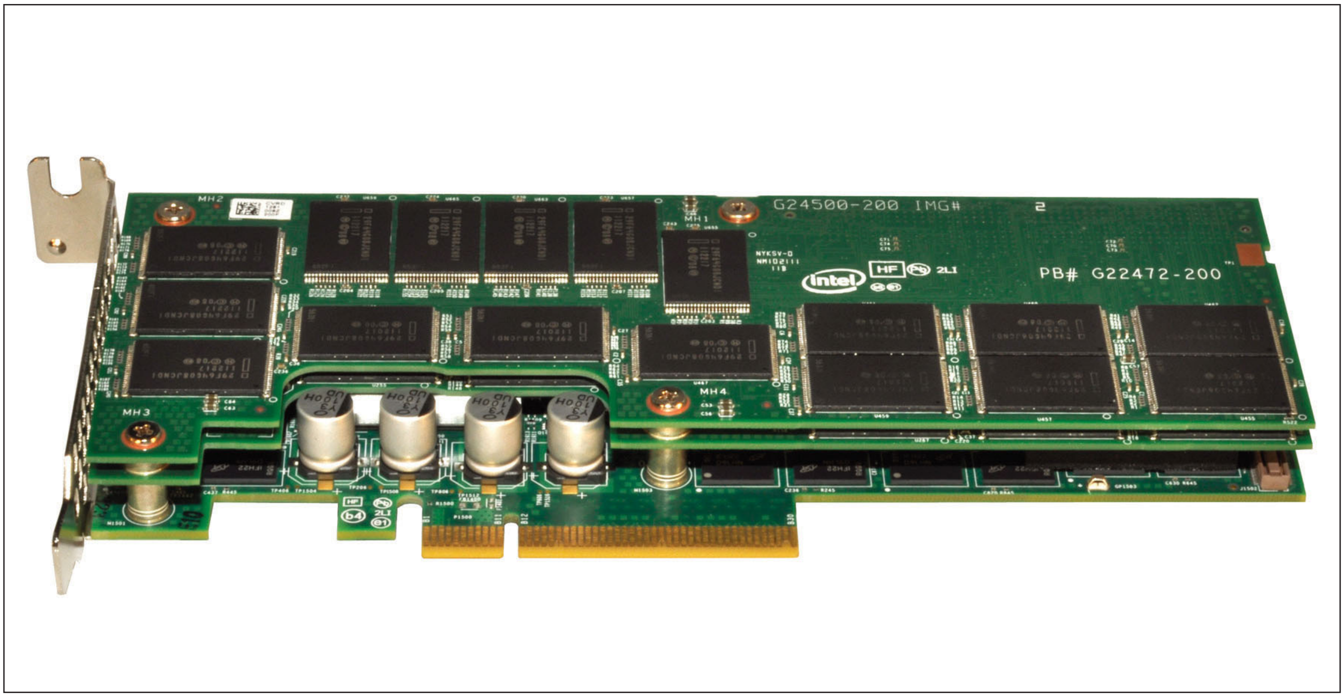
SATA Origins

Prior to SATA's rise, the ATA (Advanced Technology Attachment) standard, later referred to as PATA, (Parallel ATA), was the storage interface of choice, and as its name implies, it used a parallel communication technology. Parallel connections traditionally suffered from electromagnetic interference due to the close proximity of other wires. At its peak, the PATA interface used a 16-bit-wide data bus and a ribbon cable that used 80 wires, 40 of which were ground wires designed to reduce crosstalk, which was common at the standard's higher transmission speeds. The 80-pin connector was compulsory for UDMA (Ultra Direct Memory Access) 4 (66MBps), UDMA 5 (100MBps), and UDMA 6 (133MBps).

In an effort to reign in the number of traces and wires used for computing storage interfaces, the Serial ATA Workgroup (led by APT Technologies, Dell, Intel, Maxtor, and Seagate) turned its attention to a serial interface that consisted of two pairs of conductors. The serial data transmission scheme allows data to pass between two nodes one bit at a time. Although that sounds less efficient than PATA's multiple-bits-per-clock scheme, SATA connections can be clocked significantly higher than those of the PATA interface.

In the personal computer's formative years, serial connections dominated the platform. These serial connections worked well because they required just a single trace, dedicated pins and wires could allow bi-directional communication, and reliability came with the sparse wiring requirements. The simple wiring and smaller ports also helped manufacturers keep production costs low. For some size comparisons, look at the legacy parallel printer port vs. the serial COM port or, for a more contemporary example, compare the PATA port and a SATA port on a motherboard.

The SATA-IO (Serial ATA International Organization) introduced Serial ATA, or SATA, in 2003, and it quickly supplanted Parallel ATA in motherboards, hard drives, and optical drives. For several years, however, motherboards shipped with both SATA ports and at least one PATA



PCIe-based SSDs foreshadow SATA's high-speed future.

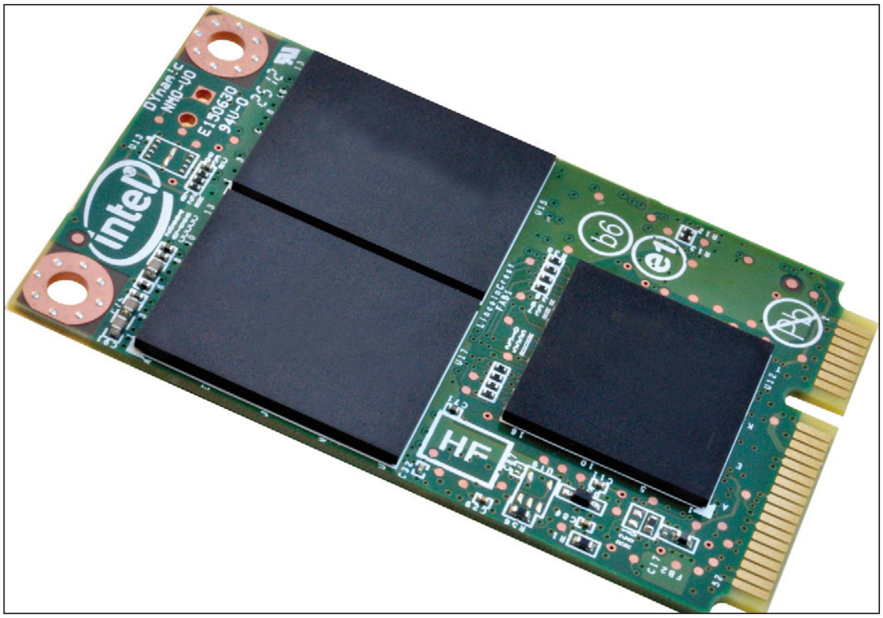
port that could connect to two legacy devices. In 2007, PATA had begun to disappear from the chipsets installed on motherboards. Intel's popular ICH10 kicked PATA to the curb in June 2008 and AMD's 800 Series chipset (SB810/SB850) removed PATA support in early 2010; we haven't looked back since.

Besides the benefits listed above, the SATA interface also brought with it support for another couple of technologies. The big one is AHCI (Advanced Host Controller Interface), although AHCI didn't really catch on until OS-level support appeared in Windows Vista/7/8, newer mainstream Linux kernels, and FreeBSD 8.0 and newer. This technology lets your SATA device support hot plugging, or hot swapping, which lets the user plug and unplug a given component without first shutting the system down. AHCI also brings with it support for NCQ (Native Command Queuing), which means different things for HDDs and SSDs. In mechanical hard drives, NCQ refers to the scheme whereby the drive can reorder the pending read/write commands to better suit how the requested data is arranged on the platters. Because it takes longer for the platter to make a single revolution than it does for the actuator arm to skip across the surface of the platter, NCQ lets the hard drive execute multiple read and write commands based on a more latency-aware sequence as opposed to just performing them in the order in which they are received. This effectively decreases the number of revolutions necessary to perform the commands. Alternately, NCQ in SSDs lets them offset host latency by queuing commands and using pipelines to process commands concurrently. NCQ on SSDs requires device-level support, and older drives can't take advantage regardless of the BIOS and Registry settings.

SATA cables are considerably thinner than PATA cables and utilize a 7-pin connector on either end. PATA cables have an 18-inch maximum length, but SATA cables can operate in lengths of up to three feet without experiencing signal degradation. On the power consumption side, SATA requires just 250mV to operate; PATA's interface requires 5 volts. Those of us who've been building computers for a while probably recall the headache of configuring Master/Slave settings and drive jumpers of PATA hard drives and optical drives.

SATA Revision 1.0

The first batch of SATA-equipped hard drives supported data rates up to 150MBps, which wasn't much faster than the fastest UDMA drives available in 2003, which operated at up to 133MBps. Around this time, hard drive and optical drive manufacturers began releasing SATA devices with both four-pin Molex power connectors as well as SATA power connectors. Users were cautioned to only connect power to one of the ports to avoid burning up the drive. PATA to SATA adapters also became available, letting users connect legacy drives to newer motherboards that offered an abundance of SATA ports.



Mobile form factor SSDs arrived with the finalization of SATA Revision 3.1.

SATA Revision 2.0

SATA really came into its own with the release of SATA Revision 2.0, or SATA II. This enabled hard drives and early SSDs to approach 3Gbps data rates, which gave consumers the incentive they needed to finally begin replacing old PATA devices with SATA ones. SATA II devices are backward-compatible with SATA I ports and vice versa. The standard drops to the speed of the slowest component. This is also when the standard began to experience some confusion in the naming scheme. SATA II was also called SATA 3Gbps, which was problematic if you wanted to refer to the follow up revision as SATA III, even though it was twice as fast.

SATA Revision 3.0

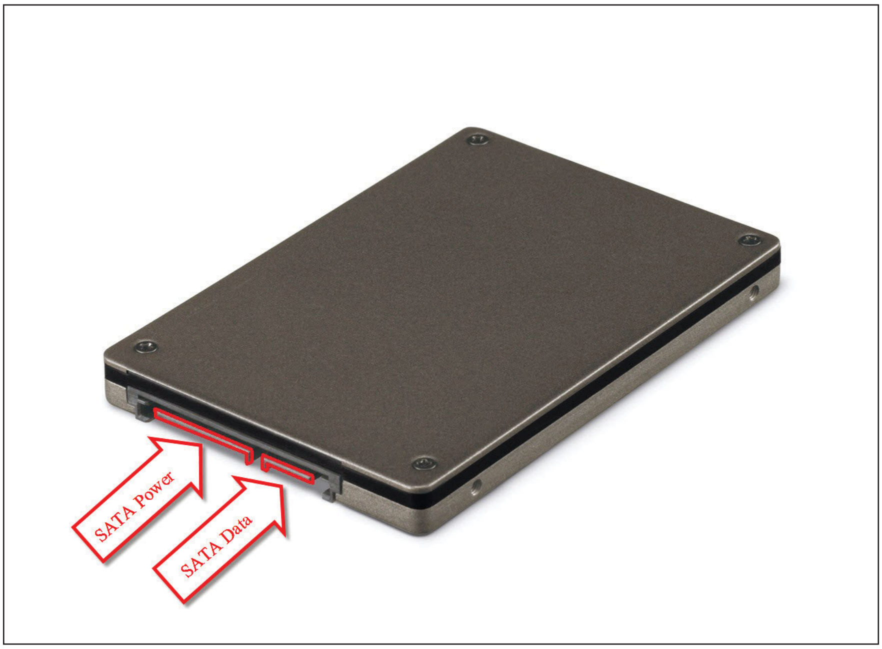
In 2009, SATA III, or SATA Revision 3.0 was finalized and launched. It brought 6Gbps data rates to SSDs and quickly became the enthusiast's most coveted storage standard. The 6Gbps SATA standard also included several new features, including Isochronous NCQ, which enabled isochronous quality of service data transfers for streaming media applications. Other extras include improved power management, a small LIF (low insertion force) connector for 1.8-inch SSDs, and a new low-profile connector for 7mm optical disk drives used in ultramobile notebooks.

SATA Revision 3.1

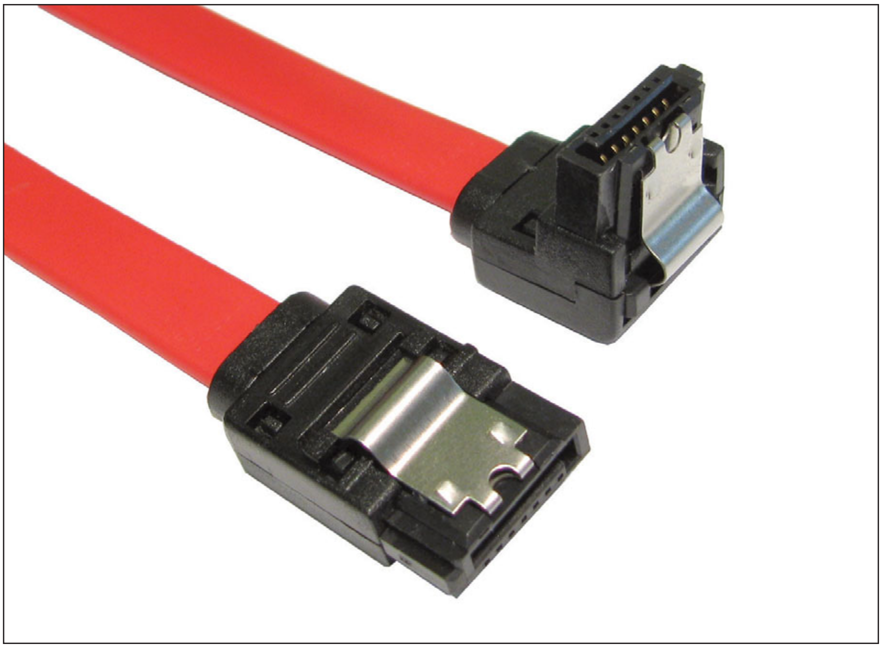
This revision of 6Gbps standard didn't add any data rate increases, but did create standards for mSATA (for notebooks), SATA optical drives that draw no power when idle, a Queued TRIM Command for better SSD performance, and power management tweaks designed to make SATA devices more energy-efficient. Other additions include new hardware control features that let the host determine the device's capabilities and a Universal Storage Module, which is a cableless interface for powered storage in consumer electronics devices.

What's Next For SATA

As SSDs get faster and maximum theoretical data rates approach SATA III's maximum 600MBps, (we've tested SSDs that get nearly 550MBps reads, with write performance not far behind) you might think that the SATA-IO would be working on the next iteration of the technology. You'd be right, sort of. The SATA-IO has been investigating SATA1200 or SATA Revision 4.0, which could double SATA III's data rates to up to 12Gbps. Based on



The SATA standard describes specially keyed connectors for data and power.



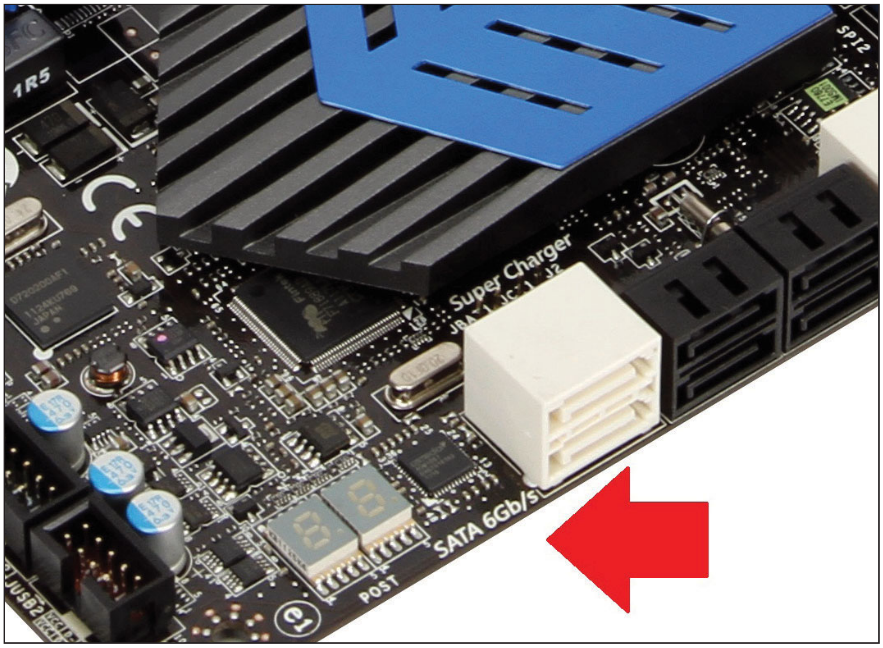
The SATA data cables are longer, thinner, and more durable than Parallel ATA's unwieldy ribbon cables.

the work that went into the enterprise-grade SAS (Serial Attached SCSI) interface, which can achieve those impressive data rates now, the SATA-IO indicates that getting the technology into the hands of consumers has so far been cost prohibitive. The organization explains that the controller for a SATA1200 interface would be an order of magnitude more complex than the current 6Gbps controller. The IC would have to be significantly larger, and as a result it would cost more to develop and manufacture, and would take up more valuable space on the motherboard. Existing cables would also not be sufficient to handle the higher bandwidth. All of this would also only address a very small niche; users who require and can afford SSDs that are capable of throughputs beyond 600MBps. As such, the SATA-IO has decided to delay further development on a 4th revision of the standard.

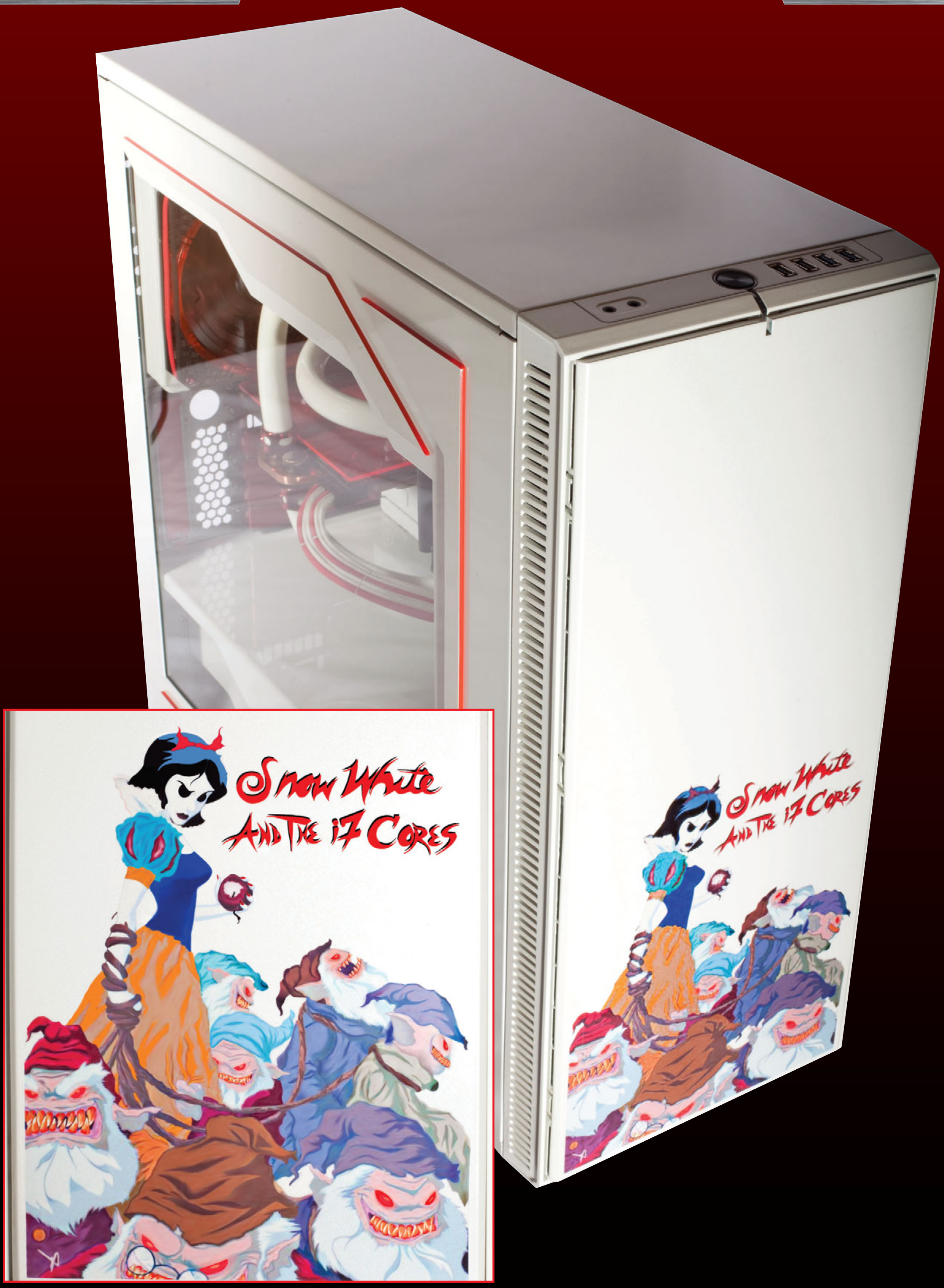
But this doesn't mean we're stuck at 6Gbps for the foreseeable future. The SATA-IO plans to have SATA Express (or SATA Revision 3.2) finalized later this year, which is a new standard that lets the PCI-Express bus double as a SATA interface. The new SATA Express connector will allow users to connect new SATA Express devices, current SATA devices, and PCIe devices. PCIe 3.0 controllers currently enable 8Gbps data rates per lane, which is a considerable bump compared to SATA's 6Gbps data rate peak. Set aside another PCIe lane, and the SATA Express interface can achieve up to 16Gbps data rates.

The SATA-IO is also looking to revise SATA's mobile form factor, mSATA, bringing speeds up by pairing with the PCIe controller and lengthening the size of the chip to accommodate more flash chips. There's no official name for the standard yet, but they're calling it NGFF, or Next Generation Form Factor.

AHCI is the software used to control SSDs, and Intel designed it with mechanical hard drives in mind. Currently, Intel is working on a new version, called NVM Express, which was built to let SSDs run free. Where AHCI could only handle 32 simultaneous commands, NVM Express can support up to 64,000 queues with 64,000 commands each, simultaneously. Despite its introduction in 2011, NVM Express hasn't been released yet. Industry observers expect NVM Express and SATA Express to debut simultaneously. Holding your breath yet? We are. ■



Today's motherboards often feature SATA Revision 2.0 ports right alongside Revision 3.0 ports, necessitating labels.


Snow White
And The i7 Cores

Snow White & The i7 Cores

Craig "SpeedBump" Adams is a new name to our "Mad Reader Mod" feature, but Adams isn't new to modding. His years of experience become apparent with just a glance at this month's winning mod, Snow White And The i7 Cores. In addition to clearly knowing his way around a workbench, Adams has a sharp eye for detail, a keen sense of what colors work well together, and a knack for adding special artistic touches that make his work unique.

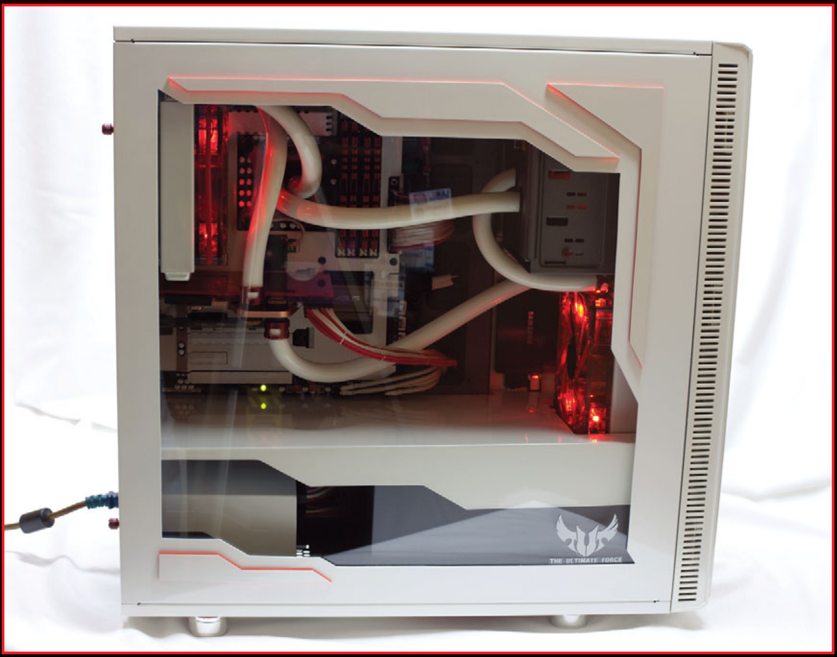
As you have no doubt noticed, white PC cases and white mods are hot right now, but Adams was determined to find a very specific white.

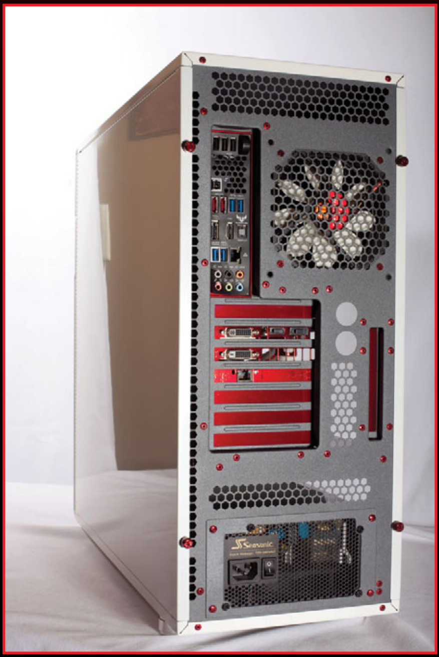
"I've used white on another mod, but it was powder-coated," he says. "White is a fairly boring color, and I wanted something with some pizazz. I spent a good deal of time looking at cars, trucks, and SUVs to find a white that I liked."

Brian Hill, a friend of Adams' who is an automobile painter, helped him with his search; their discussions led to Adams' selection of Snow White. The color's name rang a bell, especially when combined with the Intel Core i7-3770K Adams had selected to power his build, and the name "Snow White And The i7 Cores" was born.

Hill let Adams use his paint shop to give Snow White its gorgeous white exterior, paint its interior white accent pieces, and paint the remainder of the interior Nissan Sharp Silver Pearl. Adams finished with a PPG clearcoat. Adams also found a picture of Snow White and the Seven Dwarfs with just the right twist ("I wanted something kinda evil-looking," he says) and had his daughter Emily tweak the picture so it would mesh perfectly with the rest of the mod. Emily also created the custom lettering that sets the perfect tone for the picture and the mod.

Of course, paint is only part of the process that helped make Adams' Fractal Design Define XL (which shipped in Black Pearl) into the masterpiece you see here. In addition, he built a custom left side panel with a huge window and accents made from layers of white and translucent red acrylic. Adams also reworked the Define XL's interior by





moving its internal drive bays, relocating the top-mounted 180mm exhaust fan, building a custom cover for his PSU, and creating a custom acrylic panel that separates the motherboard tray from the lower area where his PSU and drives are located. Finally, he color-matched the thermal shield over his ASUS SABERTOOTH motherboard with the rest of the mod's white surfaces, sleeved his power cables, and constructed a custom cooling loop.

Snow White's components include the aforementioned Intel Core i7-3770K (OC'ed to 4.6GHz) and ASUS Z77 SABERTOOTH board, 16GB of G.Skill Ripjaws memory, an EVGA GeForce GTX 670, a Seasonic X-Series 750 PSU, two Samsung SSDs (a 256GB 840 and a 128GB 830), and a 2TB Western Digital data drive.

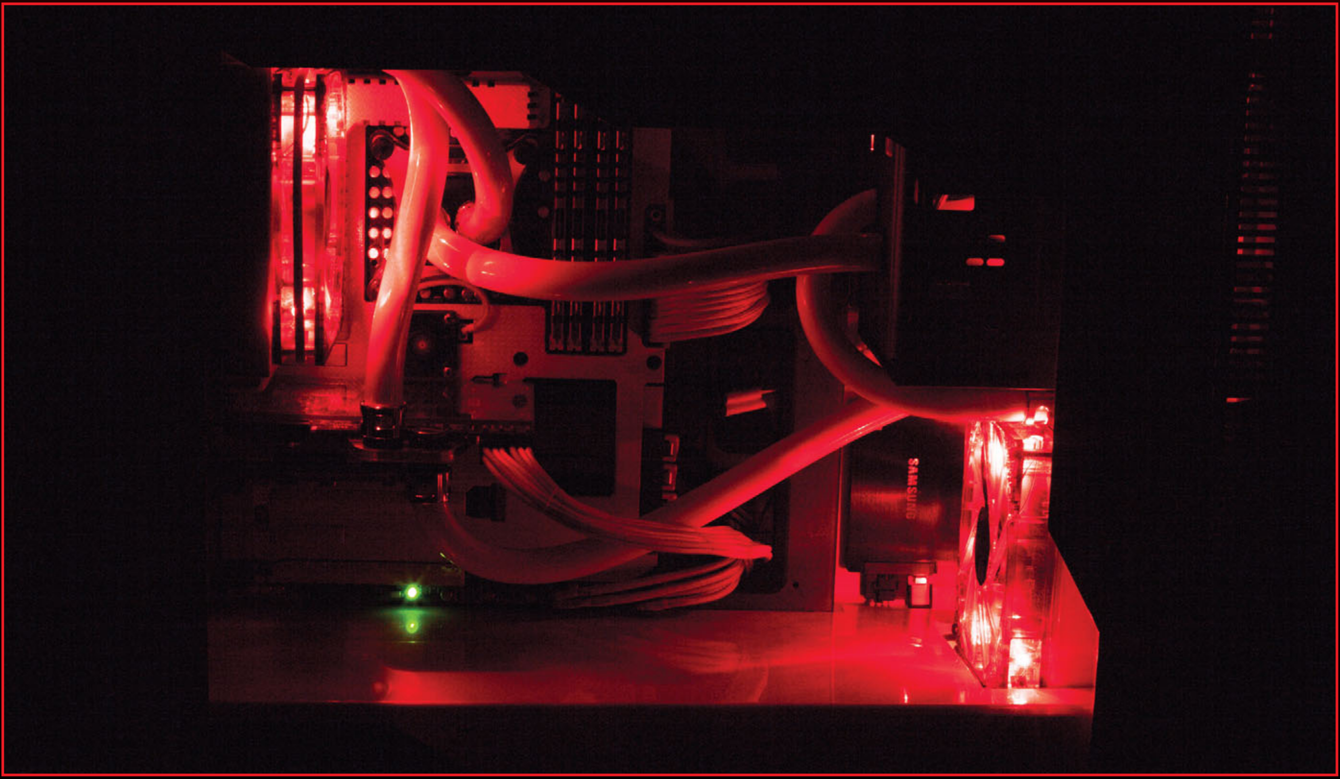
The mod's cooling loop consists of two Swiftech radiators (a 140mm rad and a 280mm unit), an XSPC RayStorm CPU block, Swiftech's MCP655 pump inside an XSPC 5.25-inch bay reservoir, an Alphacool GPU block, Monsoon compression fittings, PrimoChill PrimoFlex Advanced LRT tubing, and BitFenix Spectre 140mm fans.

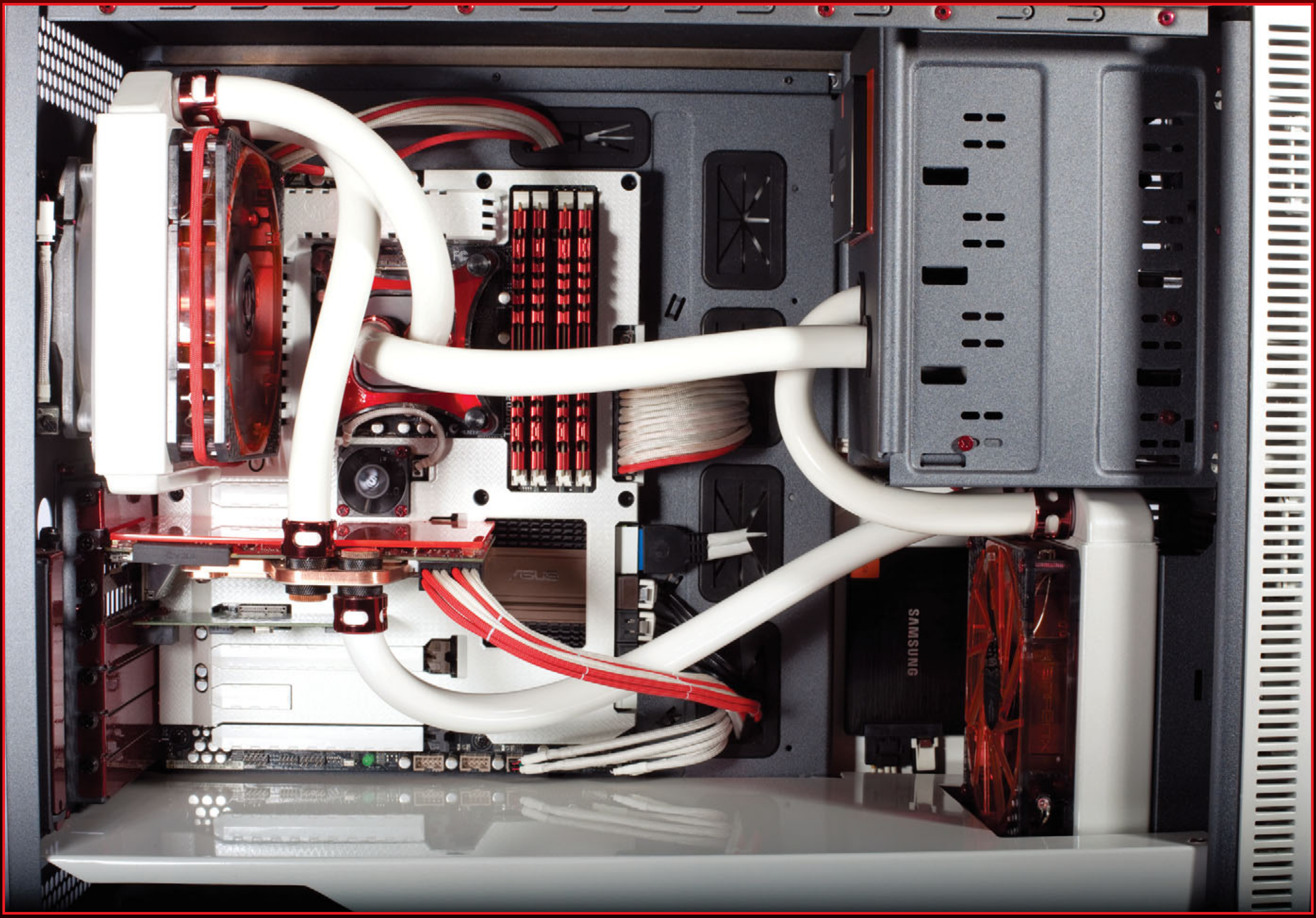
Adams is grateful to Brian Hill for the use of his paint shop and to Paul Kaschalk of Maintenance Equip and Chemicals for providing paint-stripping service. He'd also like to thank Performance-PCs.com and FrozenCPU.com for having great products, his daughter Emily for her work on the front panel graphic, and his wife Laura "for putting up with [his] near obsession with computers and modding."

We'd like to thank Craig for giving in to that same near obsession. ■

Give Us Your Mod

Have a computer mod that will bring tears to our eyes? Email photos and a description to madreadermod@cpumag.com. If we include your system in our "Mad Reader Mod" section, we'll send you $1,500 and a one-year subscription to *CPU*.

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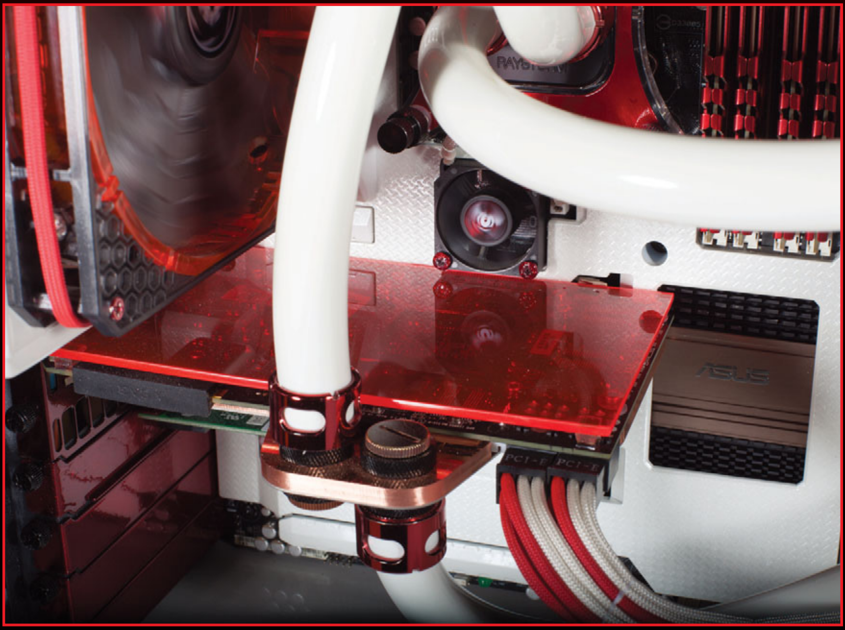

RAYSTORM
ASUS

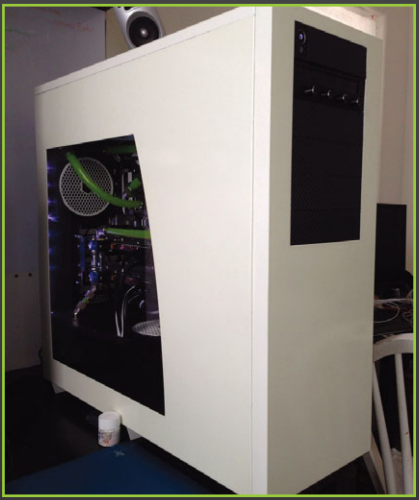
ASUS
SAMSUNG

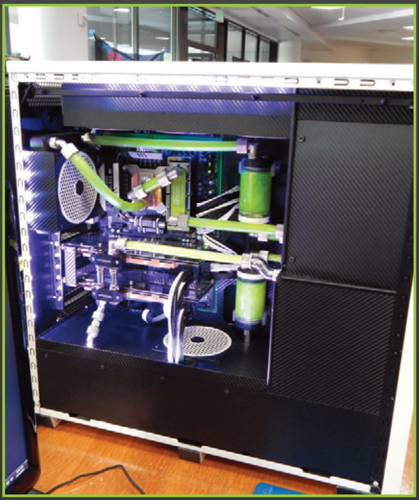
Goin' Back To Cali

Intel LANFest Sacramento

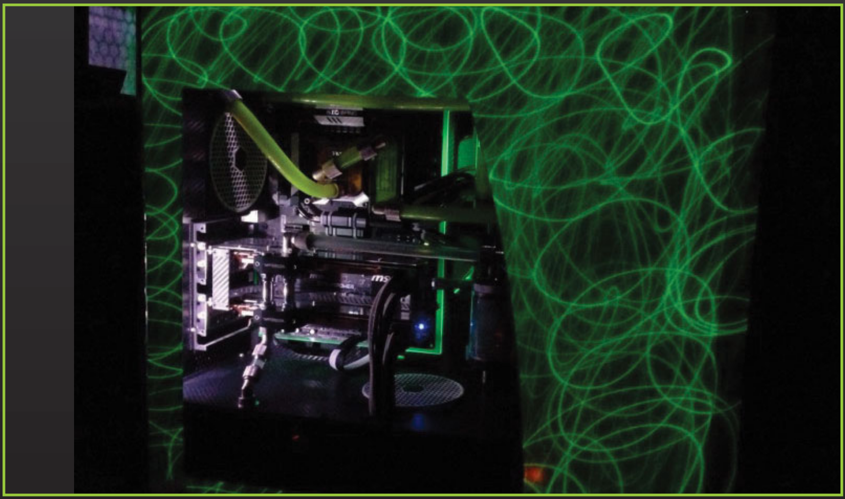
As we continued our mission to find the best mods from around the country (and to play as much Counter-Strike as humanly possible while on the clock), we attended Intel LANFest Sacramento at the Intel campus in Folsom, CA, beginning on Friday, April 12 and running through Sunday, April 14.

LANFest Sacramento event is a key event in the LANFest schedule, as well as being one of the premier LAN parties in North America. The 350-plus-seat LAN included plenty of traditional gaming events, such as StarCraft 2, Battlefield 3, League of Legends, and Team Fortress 2 tournaments, but there were also some fairly novel activities, as well. Starting on Friday night, attendees could participate in a Minecraft Hunger Games or a BF3 Dirt Bike Race. There was a scavenger hunt, an "Only at LANFest" video contest, an Intel Extreme Overclocking contest, and more. Of course, there was also a CPU-Intel LANFest Case Mod Contest, the results of which were predictably excellent.



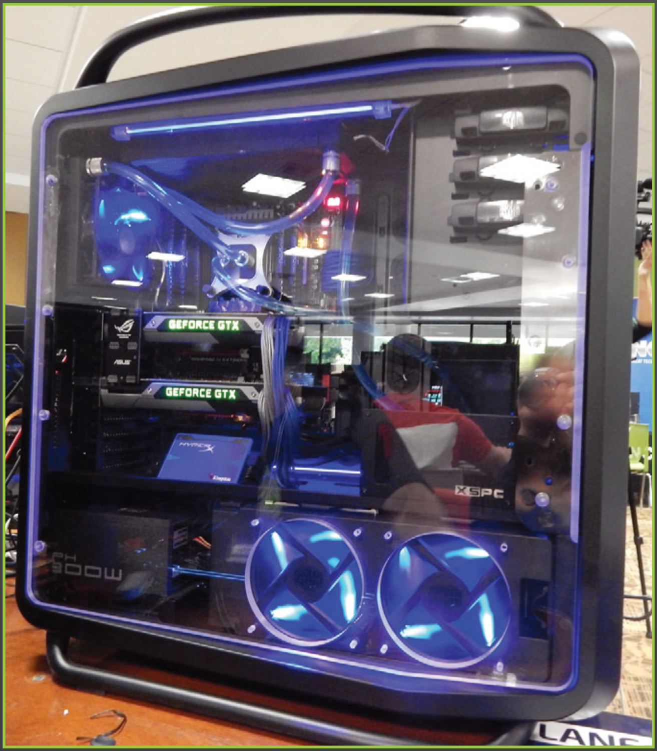


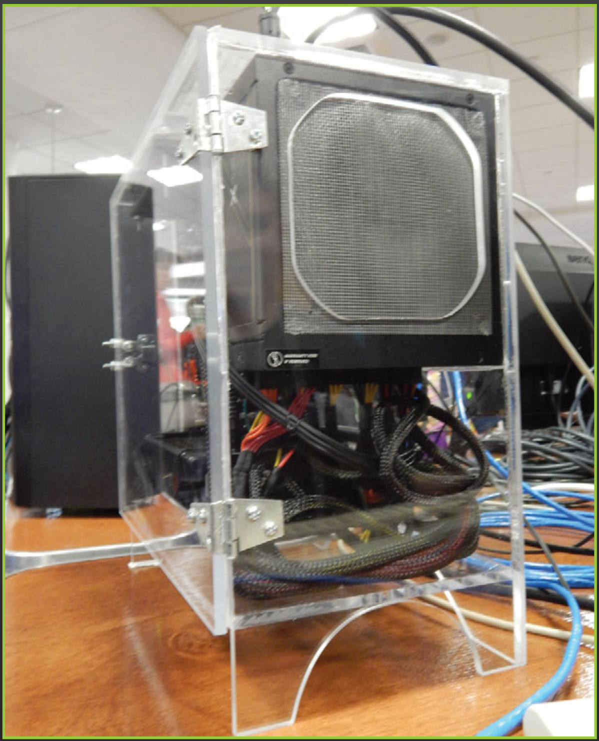
Our winner was Eric Nagano's "Project Ghost." This Corsair Obsidian 800D-based mod is gorgeous at a glance, with an immaculate white paint job, custom carbon fiber construction inside, and the sort of cable management and custom cooling that most of us can only dream of. But wait, there's more!



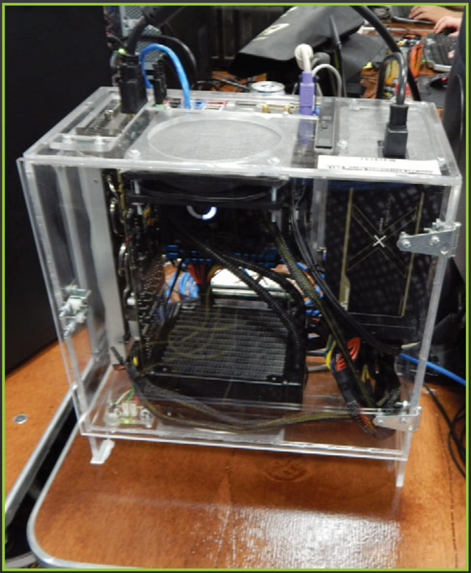
Turn down the lights and shine a UV light on Project Ghost, and not only does the crisp white exterior turn a haunting shade of green, but the finish also lets you write on any of its painted surfaces, resulting in doodles or letters, or whatever that shine like they are backlit! We've seen quite a few mods that take on a different personality when the lights go down, but Project Ghost is the ultimate example of this.

Other finalists included this Cooler Master Cosmos II-based mod, which looks deceptively stock from the front, only to blow you away as soon as you move around to its custom clear acrylic side panel.





Speaking of clear acrylic, this cleverly designed and built acrylic mod was also among our runners-up. Forget about transparency in business and government, we want more transparent cases.



They say great minds think alike, and this second Cosmos II with a clear acrylic side panel and a gorgeous interior suggests that they are right.

This blue-green Lian Li mod is a work of art, with a unique outer finish and a white interior clean enough to eat out of. Also, sharp observers will note the presence of a second motherboard (a game server, perhaps?) tucked away on the ground floor. This system is pretty, yes, but it's also a fine piece of engineering.

Another finalist, another impressive mod.

Here are a couple more cool mods we saw at the LAN. Feel free to insert your own Portal/cake jokes.

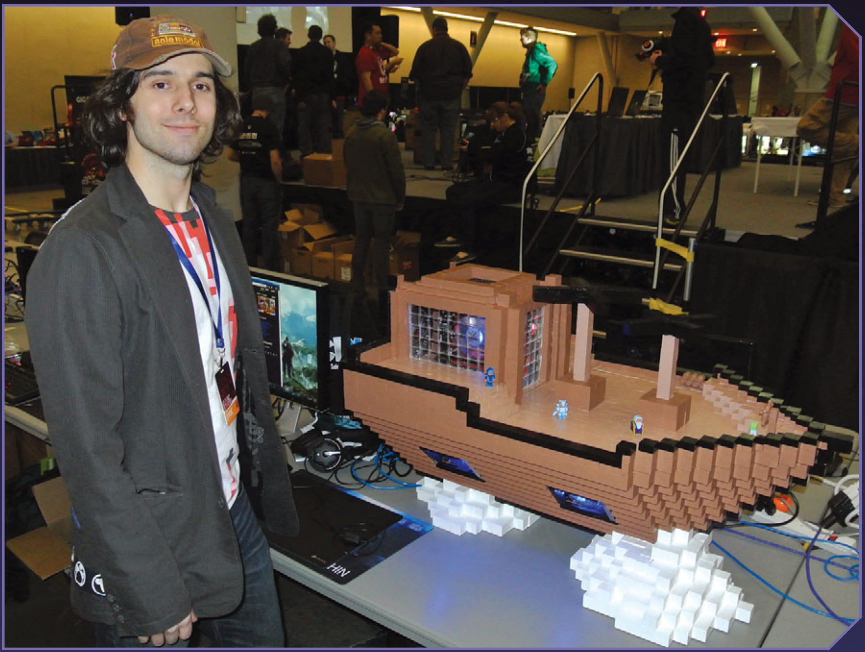
How do you top a couple days packed with gaming, contests, pizza, prizes, trophies, and more? Well, how about raising a cool 12 grand for the Muscular Dystrophy Association via The United Way? That's a pretty good weekend by any metric.

If you live in the area but missed the event, we have some good news: Planning is already underway for the fall event this October! Head to lanfest.intel.com/sacramento for more information and to check the latest news.

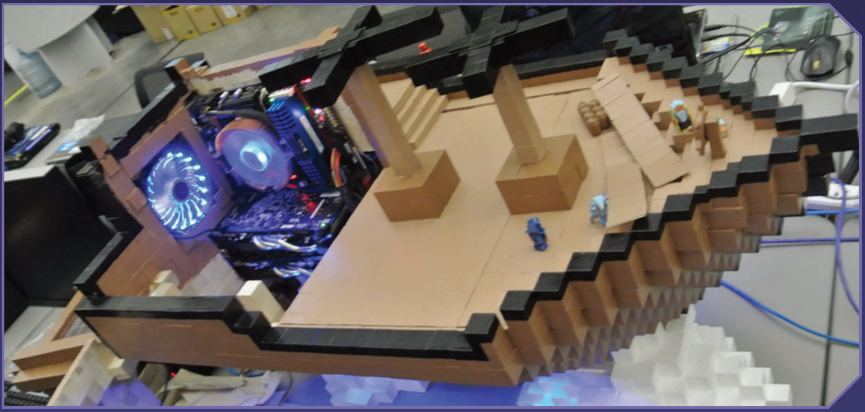
PAX East

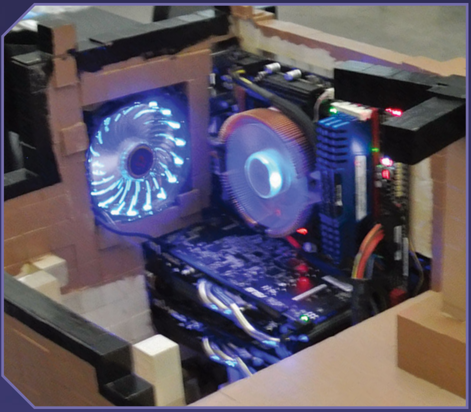
Penny Arcade's Big Game Show Returns To Boston

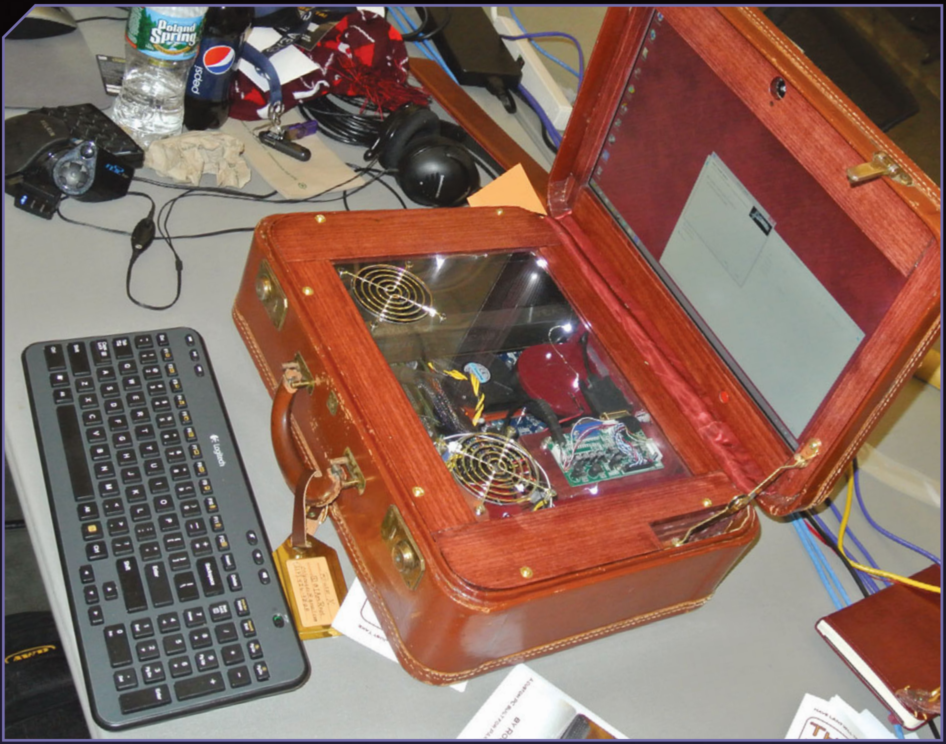
Gamers of all kinds invaded Boston in late March for PAX East to enjoy panels, try out the latest games, and play around with the newest technology. It's like E3 or CES, but for the general public. And of course, *Computer Power User* could be found in the main exhibition hall and the BYOC LAN area. Here's what we found creating the most buzz about the show, including the top three entries in our mod contest.



WINNER: FINAL FANTASY 7 AIRSHIP
We've featured Richard Clinton's 8-bit builds in the past, and he continues to impress us with his Final Fantasy 7 Airship mod, which won our Intel LANFest – CPU mod contest. Richard began by designing the airship in Minecraft. Then, he put the case together by hand-gluing and painting over 2,000 wooden cubes. The build also features hundreds of clear cubes to create the "glass-like" cockpit, where you'll find all of the system's powerful hardware. The airship even features working rotors that spin, just like they did in the Final Fantasy 7 airship. Richard used fans with propeller-style blades to enhance the airship look, and we also think that the lighting, which glows underneath the system, gives the airship a free floating feel. Richard indicated that this particular build took over 45 hours of time to create.





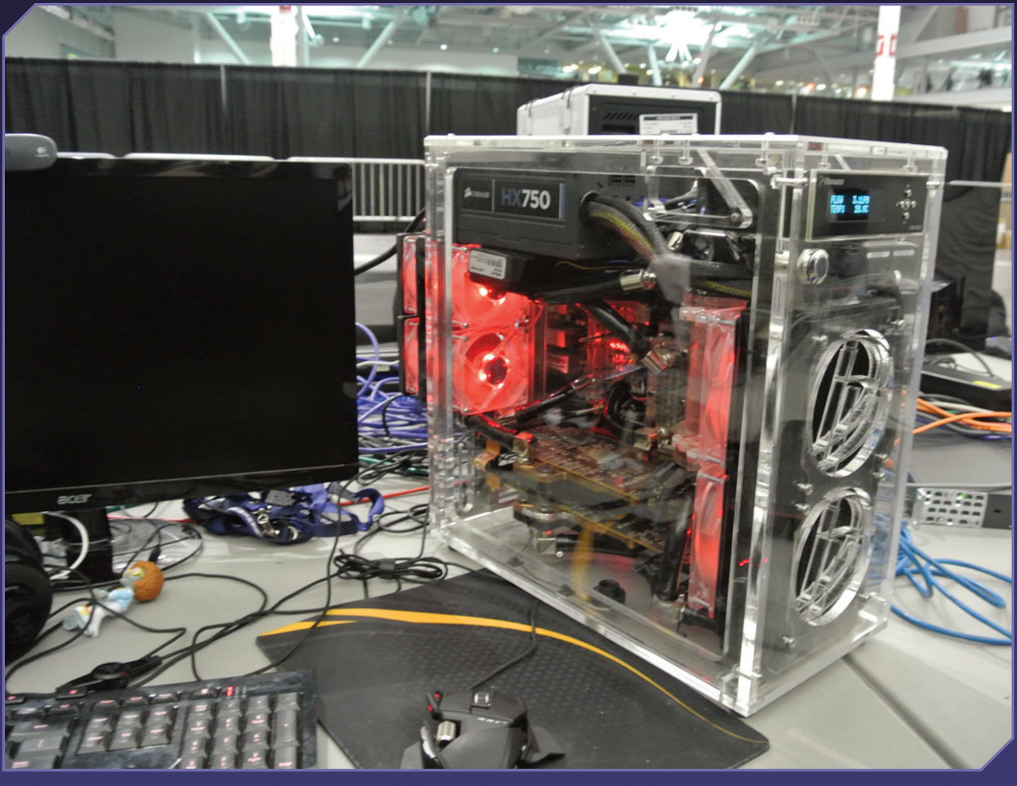


SECOND PLACE: THE REDEYE

Roger Tetzlaff found this 1940s-era suitcase at an antique store and immediately thought it would make an interesting mod. He started by ripping the guts out of the suitcase and cutting holes in the back to fit the motherboard and fan openings. Then, he added a laptop monitor (with a functioning webcam) into the suitcase's top panel and hid the cables with a red cloth that matched the look and feel of the 1940s style. Next, he built a wooden base and fabricated a metal panel to hold the case components. Tetzlaff applied a cabernet stain to the wood that fits wonderfully with the rest of the exterior look. A clear panel allows you to see the internal hardware, and the entire unit is self-contained.

THIRD PLACE: CUSTOM CLEAR CASE

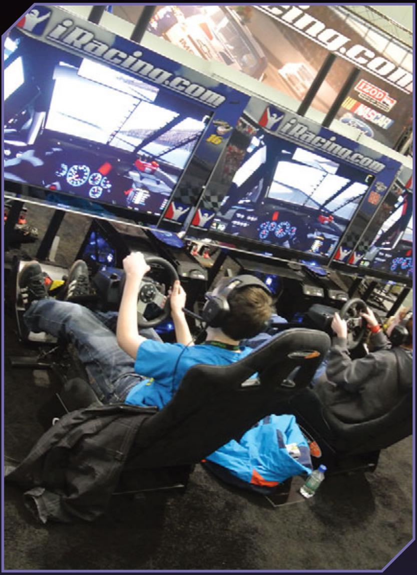
Greg Rosene's mod is a Mini-ATX case with high-end liquid-cooling capabilities for his processor and graphics cards. In addition to the chassis, constructed from parts cut to Rosene's exacting specifications, the build features an impressive cooling loop complete with a temperature monitor front panel with triple fan controls. Red LED fans bathe the interior in soft red light to highlight the internal components.



CRAZY 8 SYSTEM WINNER
Eric Murphy won the drawing for Crazy 8, the "CPU System Workshop" build featured in the April issue. Key specs in the rig include an Intel Core i7-3970X, a GIGABYTE GA-X79-UP4 motherboard, 16GB of Corsair Dominator Platinum memory clocked at DDR3-2133, and a ZOTAC GeForce GTX 670 4GB. There were a couple of hundred readers hoping to win the system at PAX East, as you can see by the large crowd huddled around our booth. Congratulations, Eric!

PAX East Sights

There was a line pretty much everywhere you looked at PAX East. Here's a shot of the line of attendees waiting to get in on Friday morning.



Game developers gave gamers a chance to really immerse themselves this year.

The League Of Legends booth was a big draw for attendees, as they could watch live matches between the top e-sports teams.

It's pretty easy to spend an entire weekend at PAX; this is just one side of the convention center.

Tt eSPORTS Level 10 M Gaming Headset

Be Seen & Clearly Heard

Despite the word "gaming" in the title of the new Tt eSPORTS Level 10 M headset by Thermaltake (mheadset.ttesports.com), it's well-suited to your music, video, and voice communication needs, too.

"The Level 10 M headset is a gaming/lifestyle headphone and a pinnacle of great design," says Jeff Chang, global PR managing specialist for Tt eSPORTS. "It's great for both hardcore and casual gamers, and everyday people.

"Gamers tend to have a bit more in demands and requirements in a good headset than most everyday people, who might just browse, surf, and use Facebook, Skype, and FaceTime," Chang says. "Thus, a headphone that meets the gamers' demands should be more than enough for the everyday user, too."

Tt eSPORTS designed the Level 10 M Gaming Headset for style, light weight, and sound quality.

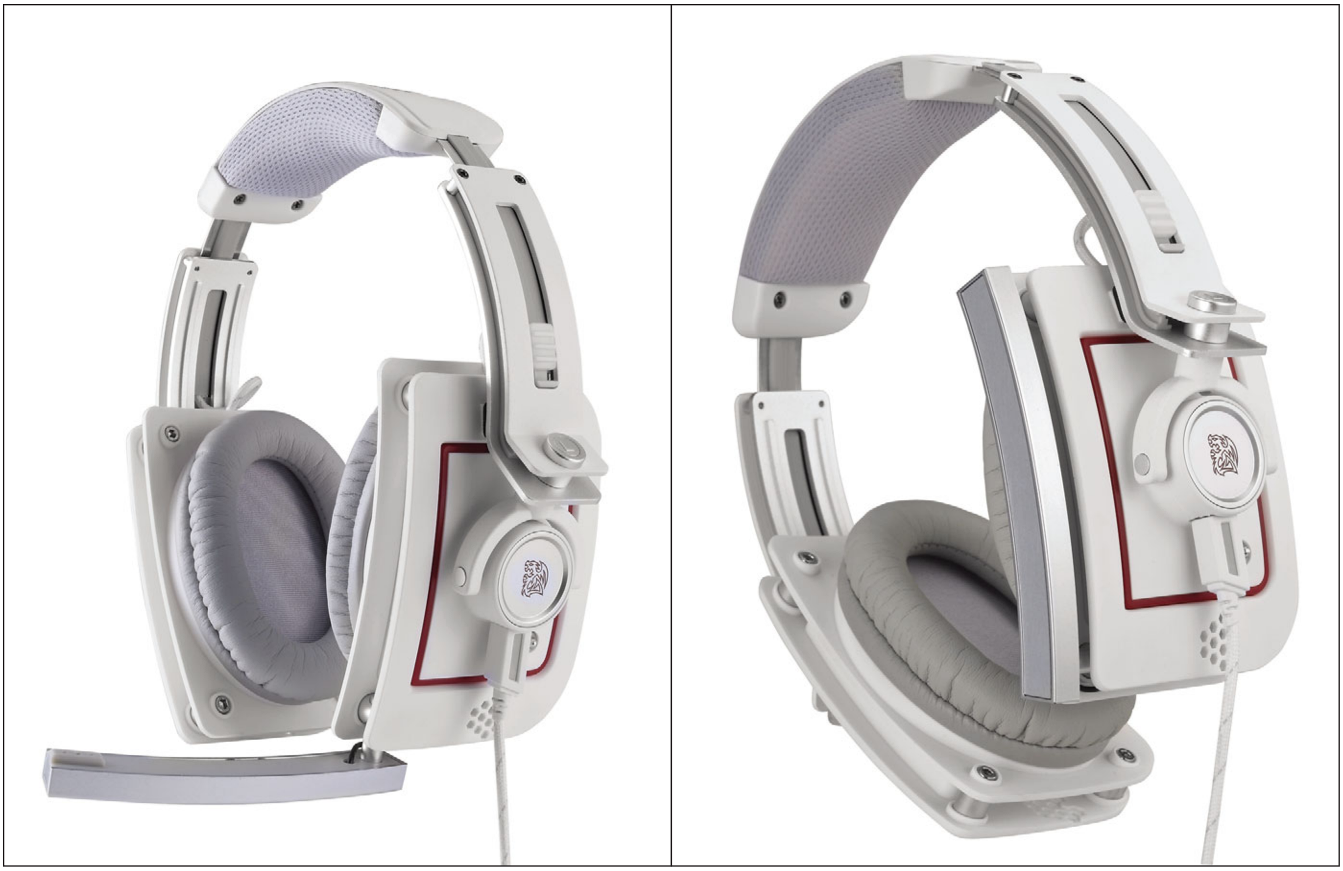
Design

At first sight, the most striking feature of the Level 10 M is its bold design, a collaboration with the BMW Group DesignworksUSA global design consultancy. It's a visual statement that invites attention and, Tt eSPORTS suggests, builds your excitement when it's time to sit down to a gaming session. You would expect nothing less from the second gaming peripheral to bear the name of Thermaltake's iconic PC case series.

"The Level 10 M headset is the latest iteration in the Level 10 project," Chang says. "Thus it carries over the tradition of the iconic design from the previous Level 10 chassis and M mouse. These include the elements of open-spaced architecture and geometric modularity."

Tt eSPORTS says that gamers' appreciation of both its Level 10 aesthetics and the characteristics of high-end headphones informed the company's decisions regarding the headset's design and functionality.

"Making no compromises on ergonomics and comfort, material choice and attention to detail is scrupulously examined. The focus is equally on



These images show you how the Level 10 M's microphone boom can tilt up and out of the way when you're not using it. When deployed, the mic can swivel horizontally to just the right position.

form and function; the use of aluminum throughout creates a beautiful finish that also brings about the benefits of being lightweight and durable," Chang explains. "The earpiece is also designed with a curved layering effect, to resemble sound waves."

Gamer-centric Features

There's a specific feature of the Level 10 M that makes it particularly interesting to gamers, and that's its long, detachable cable. It's the kind of headset cord that should have other headphone manufacturers wondering, "Why didn't we think of that?"

First, a description of the rather unusual cable, as a good visualization of it may help you to understand its benefits:

"On one end you have two 3.5mm connectors (audio and microphone)," says Chang. "On the other end you have USB. The 3.5mm audio and mic connectors go to the sound card of the PC, and the USB end goes to the headphone."

The USB end of the cable is designed to detach from the headset with a moderate pull.

"A common issue for gamers is accidents," Chang says. "Since they're so often wearing a headset, they sometimes forget it's there.

"Gamers often accidentally run over cables with their chairs, or stand up and walk away without removing the headphone. The detachability helps reduce stress on the joint where the cable meets the headphone. With a strong enough tug, the cable would just detach.

"When the cables are non-removable, this often means a wasted headset should any accidents happen," Chang says. "Not an issue here."

Personalization is another perk that gamers enjoy. In the Level 10 M's case, one example of such customizability is called bilateral USB connectivity.

"The headset was designed so that users have the freedom to plug the headphone cable into either the left earcup or the right earcup," Chang says. "This makes it easier for users who obviously have a variety of different setups."

Tt eSPORTS makes the Level 10 M in two color schemes. The Diamond Black edition has red highlights, and the Iron White version is complemented in grey. On the earcups, LEDs glow under the dragon logo and other features when you're using the headset.

An aluminum headband helps to keep the headphones lightweight (under 10.6oz). Thus, Chang says, "gamers can game on, for hours upon hours.

The inline control on the Level 10 M's lengthy, replaceable cord lets you adjust the volume and mute the mic.

Dropping the weight down allows for long-term comfort.

"The headset also grips firmly and securely to the head, but it doesn't 'clamp'," Chang says. "When you're gaming for a long period of time, a tight hold starts to feel like a vise closing in on your head. The large earpads go around the ears, which also aids in long-term comfort. Headsets that clamp hard and earpads that rest on your ears are of particular hassle to wearers of glasses."

For further comfort and personalization, the headband is resizable, but hard to knock out of adjustment.

"The adjustable headband also has locks to lock (it in place)," Chang says. "Gamers often take off their headset for whatever reason, or step away from the computer. It could even be that 'quick bathroom break' in between rounds.

"With the headband locked, they can securely remove the headset, put it down, go handle their business, and come back to play as fast as possible without worrying about the headband sizing slipping away and having to take the time to re-adjust. Less gameplay missed," Chang says.

Sounding Off

"For the Level 10 M headset, we had Tt eSPORTS-sponsored professional players try out the headphones and give input on how the sound should be to meet their rigorous standards," Chang says. "After every change, we'd send them back to the pros to try and give input again. The process was repeated until we arrived at a result that met and then exceeded their requirements."

The 40mm neodymium drivers in the Level 10 M earcups can reproduce high-frequency sounds above the range of human hearing, and yet provide a more balanced, reference signal than many headsets on the market today.

"Modern-day headphones—the mainstream ones—are often 'bass-heavy,'" Chang says. "It seems to be the hip thing at the moment.

"But for a good gaming headphone, players need to be able to hear all the fine details. A gunshot here, a footstep there, some sort of sound created by a specific action elsewhere. And these sounds need not only be clear, but they also have to be well-defined with distinct spatial positioning, in that the player should also be able to further deduce information such as location and position.

"To achieve this, the gaming headphone needs to be very resolving with an extended top end," Chang says. "Thus gaming headphones are usually much more of a balanced sounding headphone; the bass cannot be so strong that it bleeds into the midrange and muddles up the rest of the sound spectrum. If it were to do so, the important and subtle sound cues would easily be lost or much harder to notice.

It's simple to add bass response to a balanced headset for music or movie use, Chang says, but the opposite isn't true.

"If one desired more bass or warmth, they could just do it in software EQ. But on the flip side, if you voiced a headphone driver to be too bass-heavy, software EQ won't do much, if anything, to bring back the details."

"The end result is a headset that I daresay is also no slouch at music," Chang says. "It goes for the quality, the nuances, the details, and extension, much like high-end niche headphones.

"Likewise, gamers would also need a versatile microphone that's able to send their voice across to other players clearly," Chang says. "Gamers play in numerous types of environments (at home with family, alone, PC centers, LAN tournaments). The noise-canceling microphone helps eliminate the background noise, so that they can efficiently deliver whatever voice communications they need to the team or other players."

To help players stay in charge, the Level 10 M's cable comes with an in-line controller.

"Gamers can adjust the game volume and mute the microphone without having to switch applications or leave their game. No more jumping back to Windows' Desktop," Chang says. "While gaming, they also may have to pick up a phone call, or speak to someone near them. The mute helps maintain privacy."

Again, you don't have to be a gamer to appreciate the Level 10 M's style and sound. And the detachable cable with either-ear flexibility is another headset win. Whether you're Skyping, Netflixing, or fragging, these Tt eSPORTS 'phones may be just what you want to hear. ■

"Modern-day headphones—the mainstream ones—are often 'bass-heavy,'" Chang says.

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Your First System Build, Part 1

An Easy Plan For Your Hardware

System envy is a common affliction among the power user crowd. We get it: You're pretty proud of your current rig . . . until you start comparing specs with your clanmates or you take your PC to a local LAN party. Suddenly, it becomes abundantly clear that three graphics cards are better than two, processors with "X" or "Black Edition" suffixes are preferable to those without, and one SSD isn't nearly as fast as two in a RAID 0.

For experienced enthusiasts, the process of staying on the cutting edge is largely a formality. This article is not for them. Instead, we're targeting you, the newly initiated power user, someone who may have started out gaming on Mom and Dad's computer or received your first system as a gift from a woefully under-informed grandparent. You're part of the new class, a freshman, if you will. You know you need to knock the rust off your system, but because you didn't build it yourself, you're not quite sure where to begin.

A little hesitation is understandable. After all, building a new system is an endeavor that requires an investment of hundreds, if not thousands, of dollars. You don't want to make a costly mistake, and we don't want you too, either. That's why we're taking up the cause of the first-time builder and drawing up a surefire battle plan that will result in a (mostly) painless build.

Over the next three months, we'll help you with the process of picking out the right parts, putting them together, testing your creation, and ironing out any kinks you might find. At the end of our adventure, you should be well on your way to building a PC that causes a little system envy of its own.

Where To Begin?

At the risk of sounding like your high school guidance counselor, you'll be better off in the long run if you set goals for your system build, especially if you need to stay within a budget. The simple question, "What do I want to do with my system?" will help you identify which components are more important than others.

Building a system for primarily for gaming is perhaps the best way to illustrate this. Generally speaking, if you benchmark a $1,000+ Intel Extreme Edition processor against a $250 Ivy Bridge chip in any videogame, the former should only outperform the latter by a few frames per second at best. That 750 bucks buys you another high-end graphics card—maybe two—and we guarantee you'll notice more of a difference in gaming performance by going that route. When you can't have the best of everything, knowing where to spend your money is usually the difference between a good system and a great system.

Briefly, allocating more cash toward your CPU is a good idea if you plan on using your PC primarily for video and audio encoding. If you do a great deal of video editing, a more muscular CPU can handle that kind of heavy lifting, saving you tons of time in the process. Using image-editing software and running your images through filter after filter requires a lot of RAM, as does simply keeping a lot of programs running at once. More system memory may also improve the performance of programs that cache content to memory. As for storage, we can't imagine having Windows on an HDD at this point, so we recommend an SSD that's at least large enough for your OS.

You don't want to make a costly mistake, and we don't want you too, either.

This is very broad advice, obviously, so turning to our good friend the Internet is probably the best way to learn which components will provide the biggest boost to the applications you use most frequently.

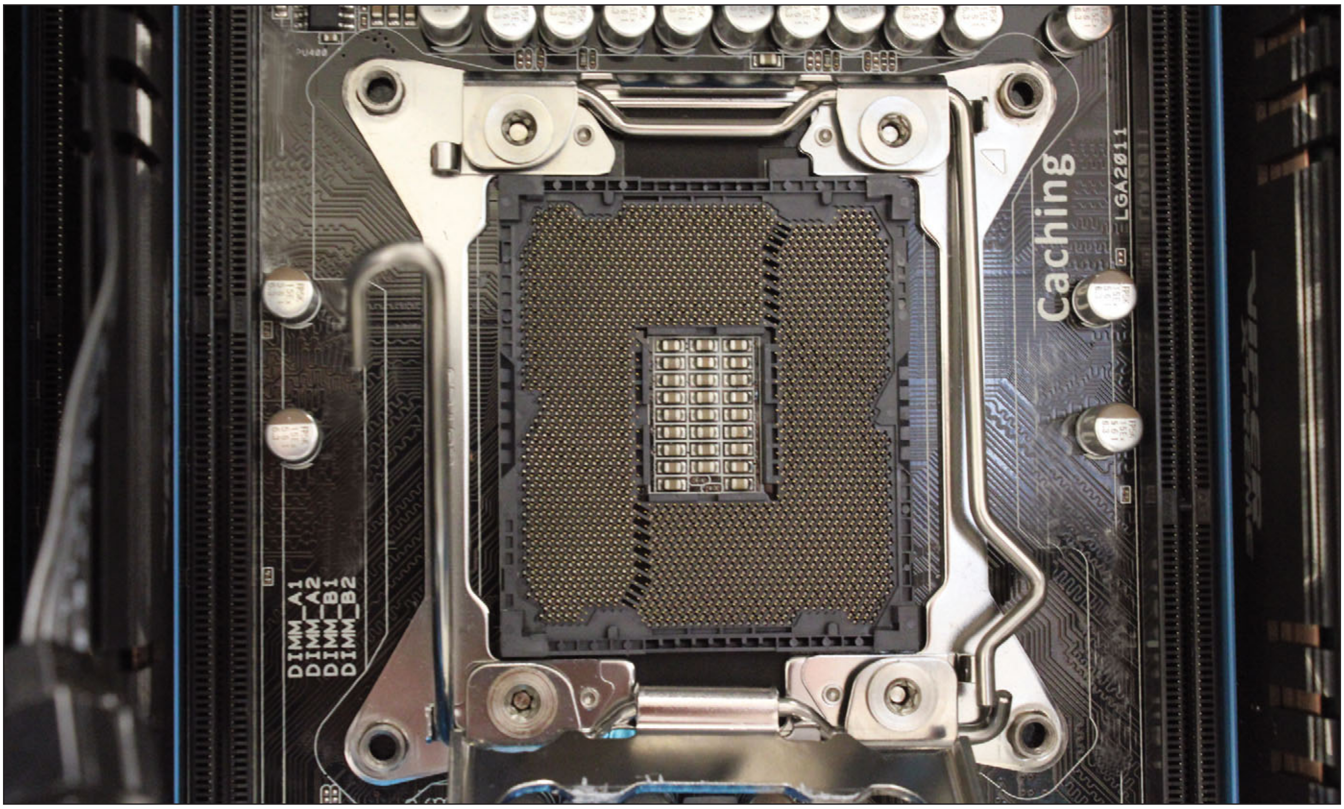
A Perfect Fit

Thankfully, we're at a point where the vast majority of PC components are interchangeable. Discrete graphics cards, for example, have used PCI Express x16 slots for almost a decade now, so a graphics card that's five years old will be compatible with a motherboard released this year, provided the latter includes at least one PCI-E x16 slot. The same is also true of system memory to an extent. DDR3 reigns supreme, and although DDR4 is on the horizon (a 2013 debut is exceedingly optimistic, but 2014 is a real possibility) we don't expect motherboards to let you mix and match DDR3 and DDR4. And besides, if you hold off building your system to wait for the next big thing, your PC will never get built.

As far as connecting this component to that component, your primary consideration should be your processor and motherboard. You need to make a conscious effort to ensure compatibility here, and it's not as simple as pairing an Intel processor with an Intel motherboard, for example.

So let's start with Intel. Currently, Intel has two dominant processor sockets for its desktop offerings: LGA1155 and LGA2011. In the case of the LGA2011 socket, only LGA2011 processors will be compatible, and with only a few exotic exceptions, LGA2011 motherboards rely on Intel's X79 chipset. Intel's LGA2011 desktop processors are based on its Sandy Bridge-E microarchitecture, which notably gives you access to quad-channel memory. These are the company's most powerful desktop chips.

Intel has released two generations of LGA1155 processors and motherboards, but we'd suggest sticking to Ivy Bridge-based CPUs (3rd Generation Intel Core i7, i5, or i3 Processors) and a Panther Point motherboard. Panther Point comprises a variety of chipsets with slightly different features, but the Z77 chipset is ideal for power users. It has more options and capabilities, such as support for multi-GPU systems and better overclocking, than other Panther Point chipsets (Q77 and H77, for example). Intel Core i7-3770K and Core i5-3570K, both of which have unlocked multipliers for more flexible overclocking, are popular matches for Z77 motherboards. Ivy Bridge CPUs also come with an integrated Intel HD



Socket slip-ups stink. The world's greatest motherboard is going to be a useless slab of PCB if your processor of choice fits in a different socket.

Picking out your processor and knowing what socket it uses helps determine the motherboard for your build, but it's not the sole deciding factor.

Graphics core, which lets you bypass installing a discrete graphics card if you don't intend to use your system for hardcore gaming.

Intel's upcoming platform, codenamed "Haswell," might throw a wrench into things. It's an upgrade from the company's Ivy Bridge CPUs, certainly, but it won't be available when you read this. Haswell will utilize an LGA1150 socket, so you'll need to hold out for a CPU and motherboard if you want to build a system around this upcoming silicon. If you can sit tight for around a month (and read our Haswell primer elsewhere in this article) for Haswell to launch, it might be worth the wait.

AMD's current desktop microarchitecture, Piledriver, forks into two processor families, each with its own processor socket. The FX line of processors is AMD's top tier; these processors rely on the AM3+ processor socket. Similar to Intel, AM3+ motherboards can use a few variations of AMD's 9-Series chipset (990FX, 990X, 970, and so forth), but unless you're building under tight budget constraints, the 990FX chipset is what you want for an FX CPU.

The other group of CPUs based on the Piledriver microarchitecture is AMD's current generation of A-Series processors. These are AMD's mainstream chips, and like Intel's Ivy Bridge CPUs, the A-Series processors have a built-in graphics core. In this case it'll be an AMD Radeon HD core. Also like the Intel HD Graphics cores, the integrated GPUs in the A-Series processors work well for basic computing and light gaming, but you will want a discrete graphics card for any kind of gaming PC. As far as socket support goes, the current crop of A-Series processors uses AMD's FM2 socket. Most FM2 motherboards use one of the following chipsets: A85X, A75, or A55. Similar to AMD's 9-Series chipset, we prefer the newer A85X chipset unless you're really strapped for cash. It gives you the most options of all of these chipsets.

Picking out your processor and knowing what socket it uses helps determine the motherboard for your build, but it's not the sole deciding factor. The physical size of a motherboard and the case you'll install it in is another key issue. Go back to the goals you set for your system. If you want an ultra-powerful gaming PC with multiple graphics cards, then you have to have motherboard that's up to the task. Typically, that requires a motherboard that's physically large, and you'll need a case big enough to accommodate the motherboard.

The inverse is true, as well. Building a compact, portable, small form factor PC or a tiny, quiet home theater PC usually requires a physically smaller case and, by extension, a physically smaller motherboard. Reducing the size of a motherboard invariably reduces its capabilities, features, connectivity, etc.

A couple of concrete examples help illustrate this. GIGABYTE's G1.Assassin 2 is a nice choice for a gaming system's motherboard, with three PCI-E x16 slots for three-way SLI or CrossFire. However, as an E-ATX (Extended ATX) motherboard, the G1.Assassin 2 won't fit in any old case. The first thing on your checklist after selecting such a motherboard is to find a case that will support an E-ATX motherboard.

Now, consider the flipside by taking a look at Cooler Master's Elite 120 Advanced, a sleek and capable SFF chassis. This is a case that doesn't take up a lot of space, but it only supports one motherboard form factor: Mini-ITX. These motherboards are frequently limited in terms of expansion slots, DIMM slots for memory, and SATA connectors for storage drives and other peripherals, so a smaller case usually means sacrificing power. Keep these things in mind when choosing your motherboard.

More Case Considerations

If your motherboard of choice uses a form factor that's incompatible with a particular case, that's a deal breaker, obviously. But even if you make that match correctly, without further vetting a case for compatibility with the other components you're considering, you still might find yourself with a chassis that limits your build.

First, you have to account for clearance for your graphics card(s). A manufacturer should provide information on the maximum graphics card length a given case will support; compare this to the graphics card(s) you've been eyeing. Most full tower cases these days are large enough to accommodate any graphics card on the market, but if a flashy midtower case catches your eye, you'd better find out if it has enough room for your flashy graphics card. It's also not a bad idea to allow an extra inch or two to account for cabling, drive bays, and so forth. In this instance, "barely fitting" is hardly fitting.

After making friends with a processor, your motherboard also needs to find a nice, polite, compatible case to join the gang. Be sure the case you want supports your motherboard's form factor.

Ask 10 power users how much memory you need in a system, and you'll get 11 different answers.

Over the last few years, closed-loop liquid coolers have become immensely popular, and ease of installation is one of the reasons so many power users have installed these CPU coolers in their builds. That said, you should double-check compatibility between your case and a closed-loop liquid-cooler. Most cases have a fan mount on their rear panel for a 120mm or 140mm fan. (And some cases have mounting holes for both.) Compare this to the dimensions of a closed-loop cooler's radiator and make sure that they match.

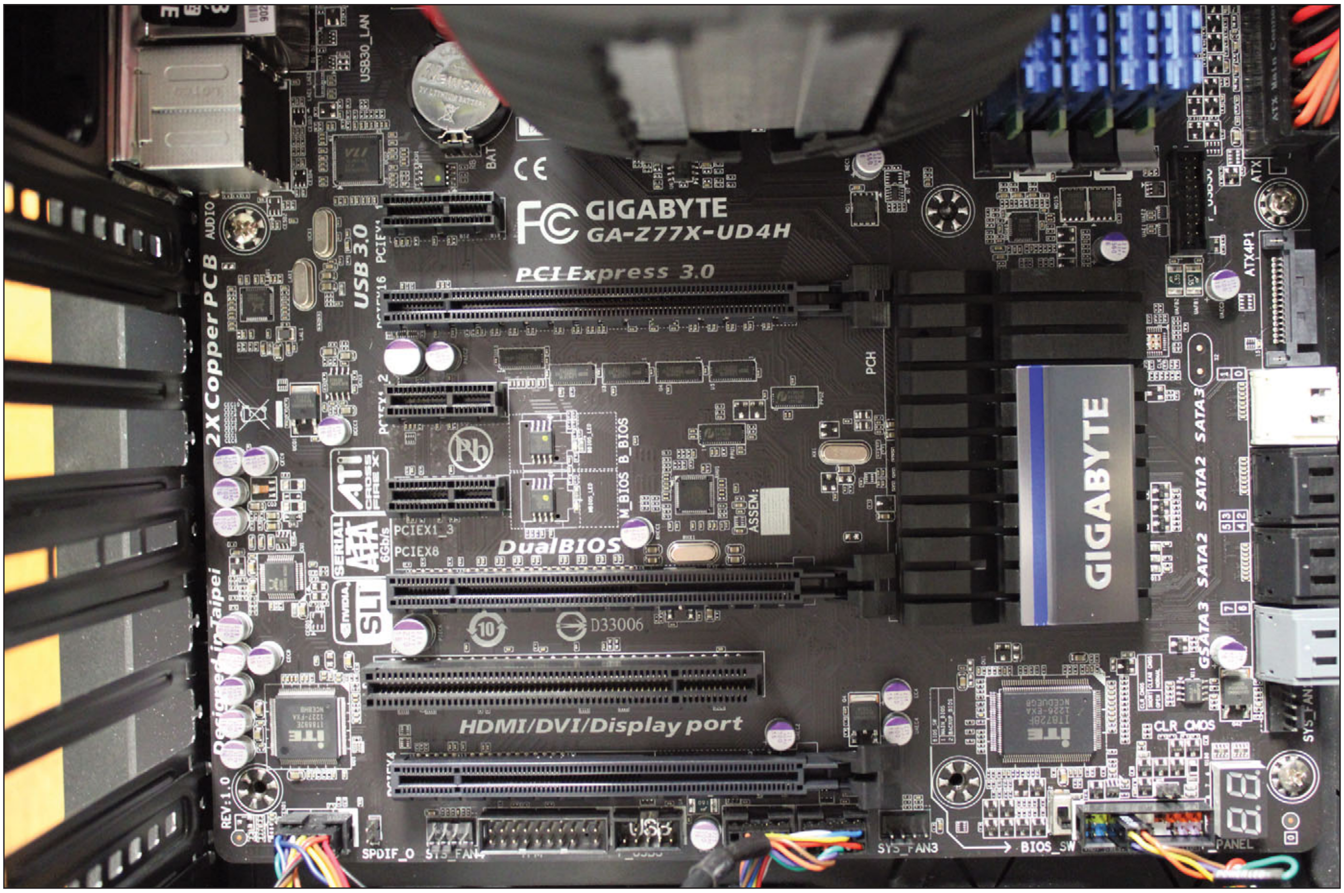
Other things to think about are somewhat more difficult to quantify. We prefer that a case's 2.5/3.5-inch drive bays face a drive's data and power connectors toward the right side panel, which helps to conceal cables and promote airflow. Now, case manufacturers are much more conscious of a system's internal cabling, so cases frequently have holes precut in their motherboard trays to route your cables out of the way. Generally speaking, more is better than less when it comes to these cable management holes.

RAM Ramblings

Is your head spinning from our high-tech rendition of "the back bone's connected to the neck bone"? For the moment, let's slow things down and discuss a component that's somewhat easier to select: System memory. If you're building a desktop system today, DDR3 is the best type of RAM because it's the only type. (As we mentioned, though, check back with us after DDR4 has landed.)

Ask 10 power users how much memory you need in a system, and you'll get 11 different answers. We think 8GB is a nice sweet spot for most users, if only because because 4GB is a little skimpy and 16GB is probably overkill for most applications. However, we wouldn't fault you for future-proofing your rig by installing 16GB (or even 32GB) of memory. RAM is considerably cheaper now than it was a few years ago.

Your CPU's integrated memory controller will dictate the ideal number of memory modules you should buy. Thankfully, this decision is even easier than how much memory you should install. Unless you're building a system around Intel's Sandy Bridge-E/X79 platform, buy your modules in multiples of two. All of the other current desktop platforms utilize a dual-channel architecture, but Sandy Bridge-E/X79 has a quad-channel architecture, so you'll need at least four modules to get the most out of Intel's flagship platform. Note that there isn't anything wrong with using four 2GB modules in a dual-channel system, but the resulting performance should be



While you're subjecting a potential motherboard to your scrutiny, be sure to inspect its expansion slot configuration, particularly how a graphics card or two might hinder the installation of other components.

theoretically identical to using two 4GB modules, all other things being equal.

Memory module speed is a thorny subject. Higher-frequency memory is quantifiably faster, obviously, but that's an overly simple statement that doesn't take a number of things into consideration. A memory module's timings (briefly, the latency, or delay between the memory module executing commands) and the quality of the ICs (integrated circuits) it uses also influence performance. The problem is that higher frequencies (good) frequently go hand in hand with higher timings (bad), so you're left playing a difficult balancing act to get the "best" RAM. Although we don't want to tell you what to buy, you shouldn't be surprised when a DDR3-2666 kit produces minimal real-world performance gains over a DDR3-1600 kit costing hundreds of dollars less.

GPU, I See You

Choosing a graphics card(s) for your build is fairly straightforward, as well. As we mentioned earlier, modern graphics cards have one slot to call home: PCI-E x16. That's good, because you really don't need to worry about a graphics card being incompatible with your motherboard.

However, that doesn't mean the motherboard plays an inconsequential role in the graphics subsystem of your build, especially if you want to install multiple graphics cards. Look closely at the motherboard's physical slot arrangement. Using a graphics card's physical dimensions, especially its length, you should be able to determine if it will either completely obstruct slots and connectors on the motherboard, or make them inconvenient to reach. What if, for example, you buy a premium sound card that uses a PCI-E x1 slot, but installing your graphics card covers up the only PCI-E x1 slot on your motherboard? Long graphics cards also have a nasty habit of making it difficult to reach a motherboard's SATA connectors, too, particularly if the connectors run perpendicular to the motherboard's surface. Installing multiple graphics cards only adds to the complexity.

Unless you choose to only use a CPU that has an integrated GPU, you will have to decide between an NVIDIA- or AMD-based graphics card. We won't point you toward a particular camp, but if you're interested in playing a specific game, we recommend searching the Internet for reviews that show a particular GPU architecture/graphics card's performance with that game. Graphics drivers can have a huge impact on a graphics card's performance with a certain game, so even though an NVIDIA-based card might be superior in Game X, its AMD-based counterpart could be superior in Game Y.

Finally, if you buy a single graphics card now with the intention of buying additional identical cards later, as your budget allows, don't wait forever. When AMD or NVIDIA release a new GPU architecture, their partners tend to quickly phase out and retire graphics cards based on the last-gen GPU. Given that GPU architectures have historically refreshed every 12 to 18 months, you can look at when a particular graphics card launched to determine how long you have to pair it with another in CrossFire or SLI.

A Place For Your Data

Like PCI-E, the SATA storage interface has been around for several years. You don't need to worry about a storage drive's compatibility with a motherboard. Still, let's consider a few things.

The SATA interface has evolved over its decade of existence. It started with a maximum throughput of 1.5Gbps but can now move your bits along at a healthy 6Gbps clip. Frequently referred to as SATA III (although SATA-IO, the Serial ATA International Organization, discourages the term to avoid confusion), 6Gbps SATA is the interface you want, now that lightning-fast solid-state drives have become affordable. Today's enthusiast motherboards should at least have a couple 6Gbps SATA ports. Having more is better.

In a very, very tiny nutshell, look for an SSD that reports good random 4K reads and writes. These constitute the majority of your computer's operations, so you'll benefit the most from an SSD

These days almost all cases, from the ultra-high-end to the eminently affordable, have precut holes to route your system's power and data cables out of sight, making for a clean interior and good airflow.

that excels in this arena. We also prefer SSDs that perform just as well with incompressible data as they do with compressible data. Finally, target SSDs that use synchronous or Toggle NAND, unless you need a budget-friendly drive. Entry-level SSDs often use asynchronous memory, which costs less but doesn't perform as well.

You know your own storage needs, but we like to buy as much solid-state storage as our budget allows while also setting aside some cash to buy a respectable hard drive for mass storage. We strongly recommend some form of solid-state storage, regardless of the type of system you want to build. Even if you can only afford a large enough SSD for your OS, it will be money well spent.

Physically installing an SSD used to be something of an inconvenience, but manufacturers have responded to these drives' popularity. Cases geared toward power users now have flexible drive bays that let you install either a 2.5-inch SSD or a 3.5-inch HDD without any difficulty.

High-end CPU fan and heatsink combos often require a considerable amount of interior real estate, so you should try to determine ahead of time that you won't run into clearance issues between a big air cooler and RAM with tall heat spreaders.

Power Play

Now that you have all of your sweet components picked out, you need a power supply capable of providing them with the juice they need to do their jobs. And like the rest of the hardware in your build, you can splurge or scrimp as your budget allows.

Unless the case you buy includes a power supply, you'll have to make a separate purchase. Thanks to the 80 PLUS program, it's usually easy to determine a power supply's efficiency. The 80 PLUS program rates desktop PSUs Bronze, Silver, Gold, or Platinum, in increasing levels of efficiency. Now, an 80 PLUS Platinum PSU is clearly going to give you a break at the pump, so to speak, over a Bronze unit, but whether you'll earn back the upfront price premium will depend on your individual usage habits. We won't fault you for buying a Silver-certified PSU if it ends up being the cheaper option in the long run, for example.

Today's power supplies aren't really incompatible with a particular motherboard, per se, but you need to make sure the PSU you buy has enough connectors to cover all of your components. This isn't an issue most of the time, unless you're building a multi-GPU system and the power supply doesn't have enough connectors for your graphics cards. And if that's the case, then the power supply probably isn't powerful enough for your system, anyway.

How powerful is powerful enough? The general rule of thumb is that PSUs are at their most efficient when running at 50% load, so buying a power supply with a continuous wattage rating of twice what your system will typically use is a good strategy. Unfortunately, determining "50% load" for your system can be a rather imprecise calculus. You can, with relative ease, determine the maximum power consumption for most of the components in your build, and we'd stick to that when shopping for a PSU. If you plan for 75% of your PSU's continuous maximum wattage to equal the maximum power draw of your components, you should wind up with a power supply that can cover your system at its most power-hungry while also maintaining good efficiency. Again, it's not an exact science.

Bargain Hunting

After figuring out exactly what components you want for your build, you're ready to embark on a new quest: getting the best deal possible. Saving a few bucks by shopping intelligently could be the key to getting a larger SSD, faster processor, or higher tier of graphics card. You'll also find that some retailers can offer value that you can't necessarily ascribe a dollar amount to.

Quite a few online retailers dedicate vast amounts of warehouse space for PC components, and these outlets are probably the most common destination for builders. Online merchants have the luxury of maintaining vast inventories of products, plus, these retailers are usually able to offer hardware at prices significantly below MSRP. Oftentimes, you won't have to deal with supply shortages, and depending on the online retailer, items you buy ship the same day you buy them. In most cases, you have the nice benefit of shopping online completely tax-free.

If you choose to cool your CPU with the power of a closed-loop liquid-cooler, make sure that the unit's radiator will work with your case.

But depending on where you live, don't count out brick-and-mortar stores just yet. If you have the good fortune to live in a city with a retailer that dedicates a large portion of its floor space to PC components, you might find that you can get a good deal in your own backyard. Cases and other parts with traditionally high shipping costs make good candidates to buy locally, considering you can take this items home immediately; do we even need to tell you how much it could cost to overnight a PC case? You should also consider that experienced computer parts retail associates can often provide valuable advice when it comes to choosing the right parts.

A great many big-box retailers maintain extensive online storefronts, as well, so you'll often find that these merchants' prices are already competitive with PC parts retailers that only sell online. Further, in order to survive the changing landscape of retail, many brick-and-mortar stores have started to price-match their online competitors. Also take note of in-store return policies, which may be friendlier and less of a hassle than those of an online seller. These are all things to consider when you weigh the value of a particular deal.

Back With A Build

Take your time with your parts selection. A system build is something you want to do right the first time. Obviously you don't want to get incompatible components, but you also want components that will last until you put together the funds for upgrades or another build. Your first build will naturally require the most research and planning. Consult friends, online enthusiast communities, and consult store associates that can demonstrate a working knowledge of building and upgrading PCs.

Next month, we'll put the pieces of the puzzle together. Expect lots of pictures, tips, and maybe a dash of sardonic wit thrown in for good measure. Get ready to get your build on. ■

Modding Masters

The Route To Immaculate Cabling

Every month, *CPU*'s "Mad Reader Mod" showcases an unbelievable, jaw-dropping custom mod that redefines what we thought was possible with the right tools in the hands of an inspired, creative, and determined modder. These are the systems that turn heads and win prizes at LAN parties, and the modders behind them are the rock stars of the PC enthusiast scene. Many of these modders are commissioned to create custom mods for the biggest companies in the business, but a lot of them got their start with little more than an idea and a clunker case in need of a visual refresh.

What if you're just beginning your modding career? "Mad Reader Mod" shows you the end result, but if you've ever followed a worklog online you know the insane amount of work that goes into these stunning creations. Sure, worklogs help explain much of the magic behind the mods, but wouldn't it be great to have a sit-down chat with the sages of modding, who have collectively amassed thousands upon thousands of hours of experience?

"Modding Masters" provides you with up-close and personal access to the pillars of the modding community. We've called on previous "Mad Reader Mod" winners as well as modders who have taken first-place honors at our LAN party case mod contests to provide their expert opinions on all things mod. It's the closest you're going to get to these rotary tool ninjas and paint booth Picassos short of online videoconferencing or criminal trespass. Listen to their wisdom, learn from their mistakes, and follow their advice, and perhaps the coveted "Mad Reader Mod" spread will one day belong to you.

Until this month, we've concerned ourselves primarily with pimping out the exterior of our case mod. Now that the case panels have their sweet new paint job and you've made all the physical modifications you planned to make, we need to spend some time making the inside of your modded rig look as smooth as the outside.

So it's after months of patient waiting that we turn our attention to cabling, one of the necessary evils of building a powerful system. As the number of components in your build increases, so too do the number of cables, and those cables have to go somewhere. On top of that, although most high-end PSUs now have sheathed wiring, you're stuck with black most of the time; if that doesn't work with your color scheme, you're out of luck without any modding.

Cable modding has been around longer than you might think. We take modular power supplies for granted these days, practically requiring them now in our high-end systems, but enthusiasts didn't have things so easy years ago. Enterprising modders were the first to take fully hardwired PSUs and convert them to modular units. We won't delve into PSU modding this month, but we do have plenty of insider information about wrangling wires so your mod has that ultra-clean look through and through.

Guiding us this month are a few familiar faces. Lee "pcunkie209" Harrington, Richard "DarthBeavis" Surroz, and Rod "[TB]Rod" Rosenberg stopped by the Modding Masters crib to impart their knowledge upon us. Have you seen these dudes' mods? Oh, you have? Well, then you'll be happy to know that they're here to give you protip after protip on the subject of cabling. Let's get things started.

Cable Concealment Philosophies

What you do with your cables largely depends how visible they will be in your finished product. "You can end up with a rat's nest if you're not careful," Harrington says, "and that can kill a good mod in my eyes."

Your first instinct will likely be to stuff your cables out of sight, and that's not a bad idea if they won't be exposed when your mod is on display. If you're not building your chassis from scratch, though, the case you choose plays a huge part of your cable management strategy.

"The biggest thing to consider is where to tuck away all your cables," Harrington says, "So case choices are an important thing since there are so many. Also, are your cables going to be long enough if you choose one of the larger cases that are available?"

Cable length is important for Rosenberg, too. "The biggest pitfall to trying to run all these cables behind the motherboard tray is cable length," he says. "Cleanliness of a case mod starts with proper cabling. The other issues include upgrading and hardware maintenance as well as blocking airflow."

> "Cleanliness of a case mod starts with proper cabling. The other issues include upgrading and hardware maintenance, as well as airflow."
>
> -Rosenberg

Of course, our Masters also agree that you can go in the opposite direction, accentuating your system's cabling as an aesthetic feature rather than a flaw.

Surroz says, "Don't think of the cabling as being something to hide but instead think of it being a feature to showcase. Spend the extra time and effort to make it look beautiful. I make the choice to accentuate them. For example, in my Holocron build, I had 25 hard drives, which meant a TON of cables. I made the cable design, including hand-making my own power cables, a feature that people loved." (Ed: Take heed of Surroz's words here, because his Holocron mod was our July 2011 issue Mad Reader Mod winner.)

"Don't hide them, show them off," Harrington adds.

Tucking cables out of sight works in some cases, and, if you're willing to invest the time, turning your cabling into a work of art can be a good choice, too. Regardless of what you choose to do, our Modding Masters offer their advice.

Out Of Sight, Out Of Mind

If you decide to stash your cables, your first priority is to find (or make) a good hiding place for them. The first, and most obvious, is behind the motherboard tray. "Hide as much behind the motherboard tray," Harrington says, "but at the same time, try and make it neat. Zip ties are your friend."

In addition to cables, that trusty motherboard tray can be good for hiding other components, too. "Storage drives always seem to get in the way," Rosenberg says, "so with a lot of mods, I try to hide the drives or mount them behind the motherboard tray to avoid the extra cabling they bring along with them."

Another solution is to take matters into your own hands and create your own solution to hide your system cables. In fact, all of our Masters says that they've done this in their mods.

"I have made a few different case add-ons to hide and route the wires behind them," Harrington says. "This is an easy way to deal with wires—cover them. If you have the tools and imagination then the options are endless."

"I like to get a piece of acrylic and cut it to shield wires and to hide them," Surroz explains. "One easy trick is to make a box that goes around the PSU."

Your trusty pin extraction tool is invaluable in disassembling power supply cables.

Cables By You

Maybe the cable sheathing that came with your power supply isn't what you

If you've already flexed your creative muscle to mod the outside of the case, why not do it on the inside, too? Here, Lee "pcjunkie209" Harrington shows off some of the custom pieces he made to conceal and route his mod's wiring.

need for your mod. It happens a lot. Just know that if you want to create fully custom-sheathed cables/wires for your mod, then you need to be prepared to invest a ton of time into doing it right. "The most important thing needed for this is patience," Harrington says.

It all starts with making the proper measurements. "Measure three times before you think about cutting," Surroz says, "and make sure you measure three more times before you seriously think about cutting, then three more times before you actually cut. Yes, it pays to be obsessive-compulsive."

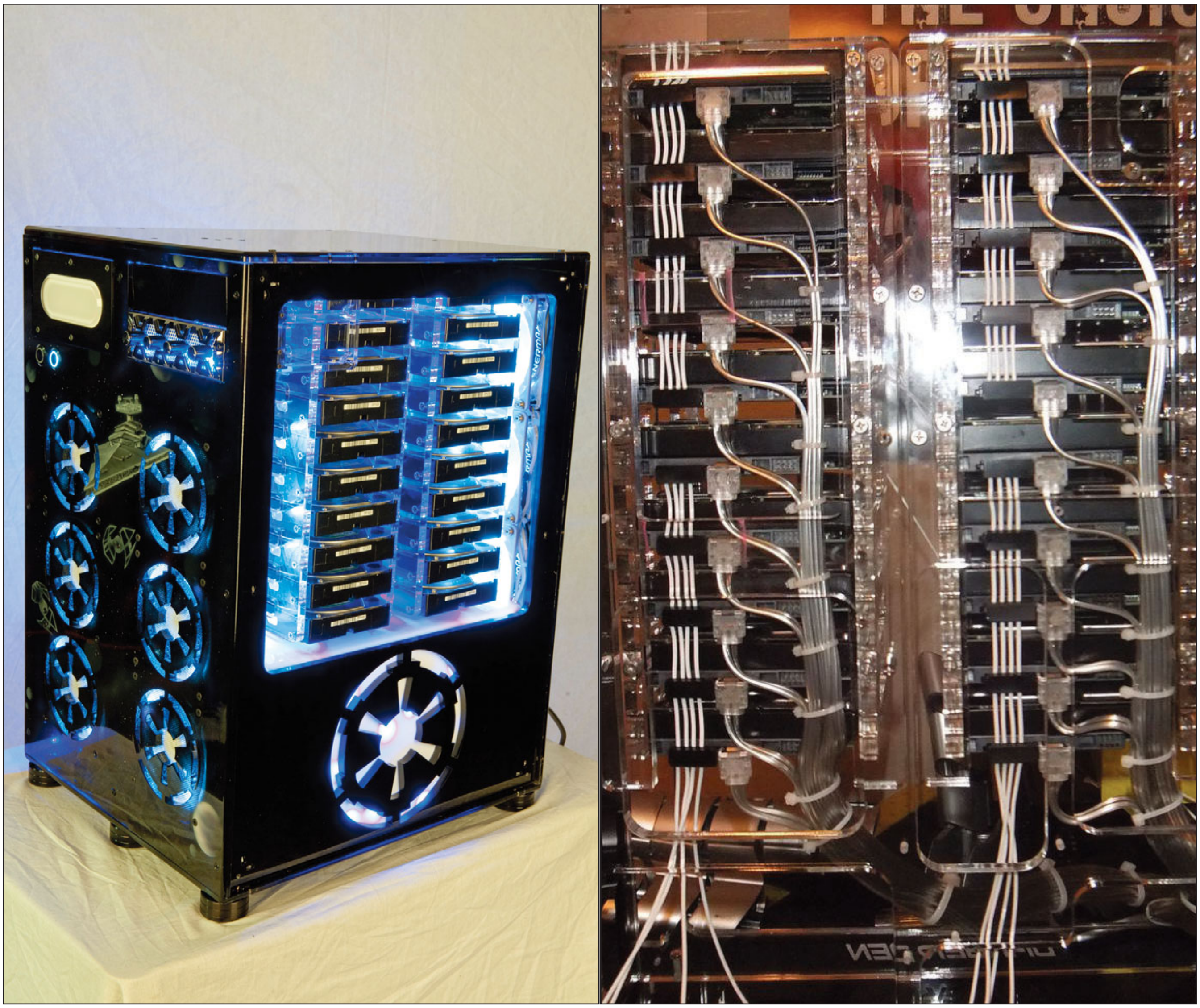
The following process is a general outline of what you need to do to remove your power supply's existing sheathing and replace it with a custom look. The steps necessary to apply custom sheathing to a PCI Express cable is slightly different from a 4-pin Molex cable, as is custom-sheathing a cable that has multiple connectors. The basic principles are roughly the same. Our Masters recommend Lutro0's series of video tutorials (www.youtube.com/user/lutro0) when you're ready for all the nitty-gritty information.

Creating custom cable sheathing, like many aspects of modding, requires a specialized toolkit. Surroz insists on using only high-quality tools. You'll be doing a lot of destruction here, so start with getting yourself a nice, small utility knife, like an X-ACTO. This and a pair of scissors come in handy for removing your power supply cables' existing heatshrink tubing and sheathing, respectively. To remove the wire pins from your PSU cables' various power connectors, you have to have pin extraction tools for each connector.

To assemble your custom-sheathed cables, you'll need heatshrink tubing and the sleeving material of your choice. Paracord is one of your best bets; it's available in countless colors from many retailers. Rosenberg says that he favors using 550-pound paracord, stripped of its inside strands, for his sleeving.

For applying your own heatshrink, our experts say, you'll need your own heat gun. A hair dryer is neither powerful nor focused enough to make the heatshrink do its magic, and a lighter is too clumsy. A good heat gun will let you easily work with your heatshrink tubing.

Last but not least, our Modding Masters have two additional recommendations for tools that will aid you in applying your own sheathing



Wires are inevitable, and lots of components means lots and lots of wires.
But instead of hiding them, Richard “DarthBeavis” Surroz chose to embrace them in his Holocron mod.

to individual wires: a lighter (yes, but this is different) and a small pair of wire cutters. These two tools are incredibly useful for working with paracord.

Start by breaking down your power supply’s cables. Using your utility knife carefully make an incision in the cable’s existing heatshrink and then remove it. The scissors can cut through the sheathing, so at this point you should be able to work with the cable’s individual wires.

Next, take the proper pin extraction tool and insert it through the power connector. You want to push the pin extraction tool and the wire toward each other, which should free the wire’s metal pin from the power connector and let you pull the wire out. Repeat this on the modular cable’s other connector at the opposite end of the wire. As you gain experience and confidence, you’ll most likely find that you will be able to simultaneously remove multiple wires, but for now, we recommend removing and sleeving one wire at a time.

When you buy heatshrink, you’ll probably get one long piece. Cut two pieces, one for each end of the wire, that measure roughly 3/4 to 1 inch long. Next, use a pair of needle-nose pliers to slightly expand the diameter of one of the ends of each piece. Set the tubing aside.

Take a length of paracord and very briefly (1 second is about right) expose one end to the flame of your

"Measure three times before you think about cutting, and make sure you measure three more times before you seriously think about cutting, then three more times before you actually cut. Yes, it pays to be obsessive-compulsive."

-Surroz

lighter. Your goal should be to slightly melt and the outside of the paracord without melting the inner strands. Heating the end lets you taper it with your fingers. Next, hold the paracord together with the wire you want to sheath in order to get the appropriate length of paracord. Cut the paracord to length and introduce the newly cut end to the business end of your lighter, as well, tapering it again. At this point, you should be able to seize the paracord's internal strands with your wire snips and pull them out, leaving the paracord hollow.

It's incredibly easy to snag the metal pin of your wire on the paracord, so take a small piece of masking tape and wrap it tightly around the exposed metal. Then, guide the wire through the paracord; you should be able to apply light pressure on the paracord with one hand while pushing the wire through with the other.

Once you've slipped the paracord over the wire, leaving the metal pins and small amount of wire exposed, you can remove the masking tape. Slide a piece of your heatshrink over the pin, leading with the end of tubing you expanded a moment ago with your needle-nose pliers. Your heatshrink tubing should cover the end of the paracord and the small bit of exposed wire. Blast the heatshrink with your heat gun until it contracts over the wire and paracord.

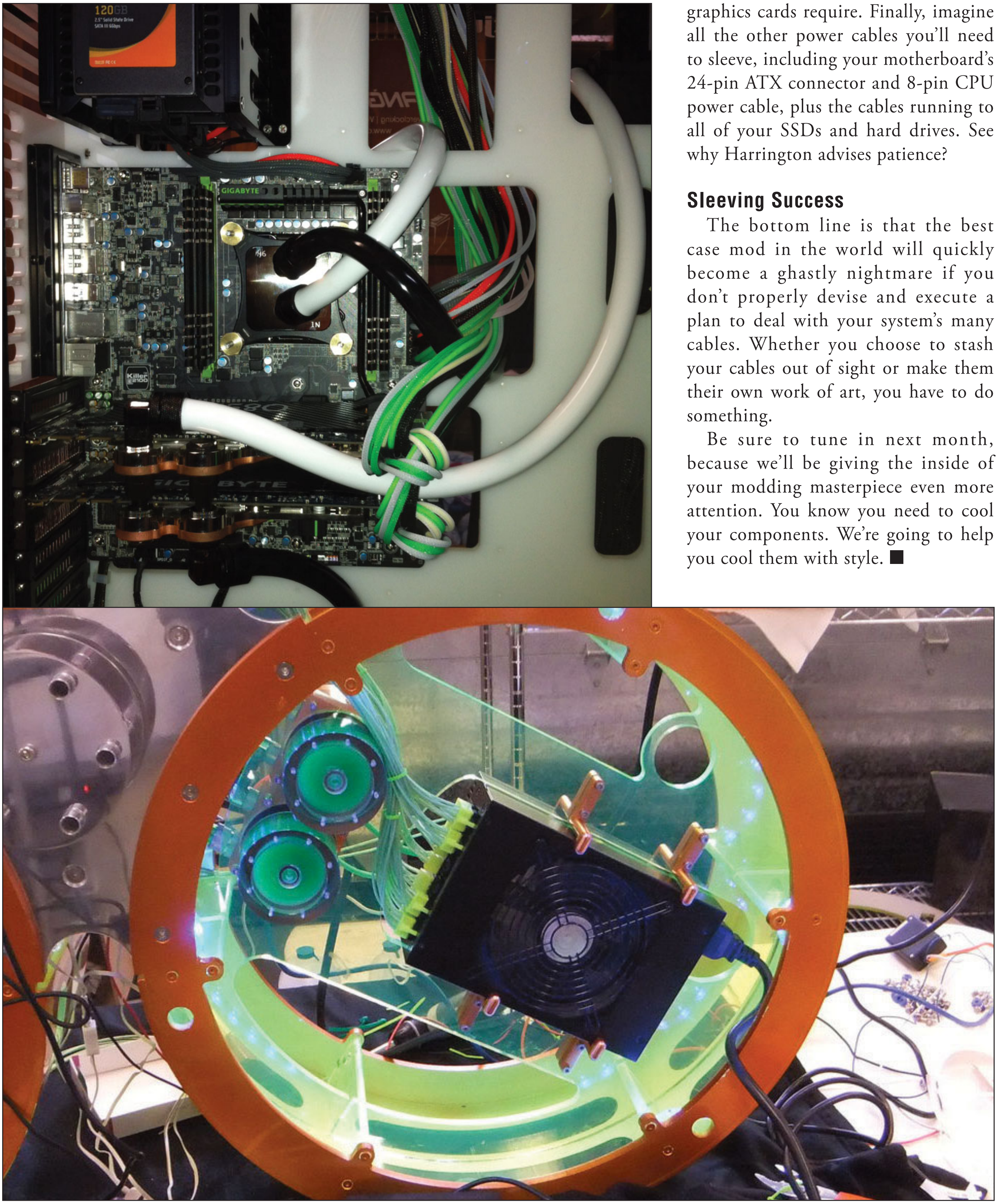
Let the heatshrink cool until it is warm to the touch, the reinsert the tip of the wire into its corresponding place on the power connector. You will likely find that this takes a little trial and error, as achieving the optimal temperature is crucial. If you leave the heatshrink too hot, it will crumple up when you reinsert the wire into the power connector. If you let the heatshrink cool too much, you'll probably have difficulties reinserting the wire. Grasp the wire firmly by the heatshrink and push the wire into the connector. You may hear a slight click when the small barbs on the metal pin latch onto the power connector.

That wasn't too bad, right? Well, you'll need to apply heatshrink to the other end of the wire and reinsert that end back into its connector. Now imagine a single 8-pin PCI-E cable and consider that you'll need to do this seven more times for one power cable. Next, think about all the power cables needed to provide the juice your graphics cards require. Finally, imagine all the other power cables you'll need to sleeve, including your motherboard's 24-pin ATX connector and 8-pin CPU power cable, plus the cables running to all of your SSDs and hard drives. See why Harrington advises patience?

Sleeving Success

The bottom line is that the best case mod in the world will quickly become a ghastly nightmare if you don't properly devise and execute a plan to deal with your system's many cables. Whether you choose to stash your cables out of sight or make them their own work of art, you have to do something.

Be sure to tune in next month, because we'll be giving the inside of your modding masterpiece even more attention. You know you need to cool your components. We're going to help you cool them with style. ■



Custom-sleeving your own PSU cables requires extreme patience, but the end results are incredible.

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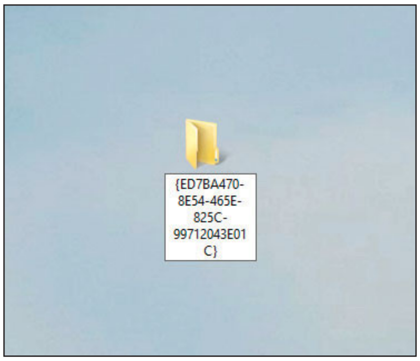
And if you have a mod you want to share with the world, drop us a line and let us know at madreadermod@cpumag.com.

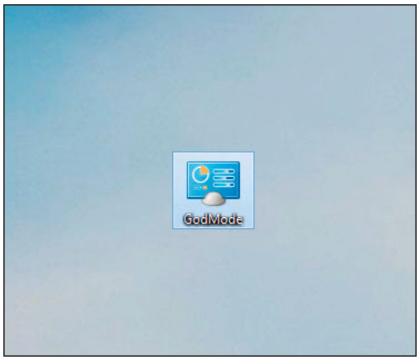
Each month, one modder's work will show up on the cover and in the monthly "Mad Reader Mod" feature. If it's yours, you will win a cool $1,500—and massive bragging rights.

Access GodMode (& More) In Windows 8

Much of the criticism leveled at Windows 8 focuses on the low-hanging fruit of the interface. But in the past several months, we've covered quite a few topics in "Software Tips & Projects" designed to help you make Windows 8's interface more useful than ever. The less obvious but perhaps more problematic thing about Windows 8 is the fact that you can't access the settings and configuration menus the same way you did in Windows 7 and previous iterations of Microsoft's operating system. But with a special GodMode folder that you can add to your Desktop and Start screen, you can put more than 250 settings, low-level tasks, administrative tools, and tweaks at your fingertips. We'll show you how, and we'll look at a few other ways to unlock Windows 8's hidden features, as well.



The GodMode folder icon doesn't look like much before you press ENTER.



Although we've called it GodMode, you can name this special-destination folder anything you want.

Tweak Your Folder Settings

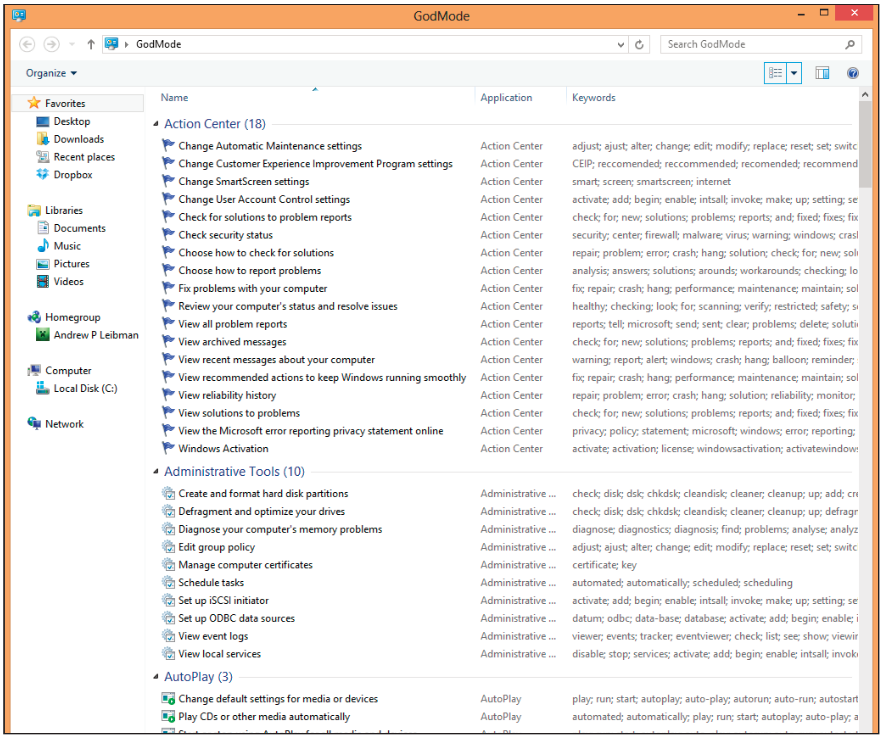
To get the GodMode folder to display properly, you'll need to adjust how your folders display hidden items and file extensions. Start by launching File Explorer and clicking the View tab. From here, you're going to need to make sure the File Name Extensions and Hidden Items checkboxes are checked. Close File Explorer, right-click an empty spot on the Desktop and click New, and then Folder. In place of the folder's name, type **GodMode.{ED7BA470-8E54-465E-825C-99712043E01C}**, and then press ENTER. The folder icon will be replaced by the Control Panel icon. When you double-click the folder, you'll find numerous handy operations to perform by simply double-clicking one of the respective entries. The Action Center operations appear at the top of the list. Double-click Check Security Status, for instance, to view recent messages in the Action Center.

As you can see, this is a neat trick, but if you're like us, you're probably wondering how it works, and why Microsoft would hide such a useful function in Windows. Incidentally, this trick also works in Windows 7.

What Is GodMode?

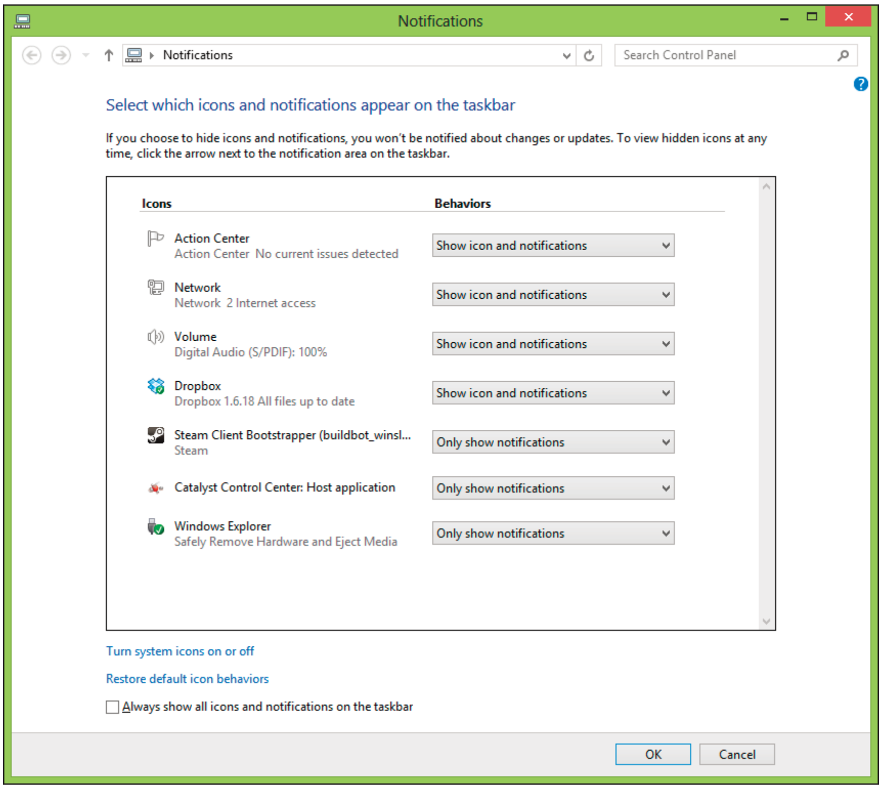
GodMode is actually just a folder that points to a special destination, in this case, the Control Panel. According to Microsoft, the GodMode folder is merely one of many undocumented features that are designed to give developers direct access to a variety of Windows' settings and core functions. This destination isn't officially called GodMode, either. You can name it anything you want, just type your preferred folder name before the period and then insert the relevant CLSID key (a globally unique 128-bit hexadecimal number that identifies a COM-class object) within a pair of braces or curly brackets. For instance, replacing the folder name with **CPU.{ED7BA470-8E54-465E-825C-99712043E01C}** will create a Control

GodMode is actually just a folder that points to a special destination, in this case, the Control Panel.



Name	Application	Keywords
Action Center (18)		
Change Automatic Maintenance settings	Action Center	adjust; ajust; alter; change; edit; modify; replace; reset; set; switc
Change Customer Experience Improvement Program settings	Action Center	CEIP; reccomended; reccommended; recomended; recommend
Change SmartScreen settings	Action Center	smart; screen; smartscreen; internet
Change User Account Control settings	Action Center	activate; add; begin; enable; intsall; invoke; make; up; setting; se
Check for solutions to problem reports	Action Center	check; for; new; solutions; problems; reports; and; fixed; fixes; fix
Check security status	Action Center	security; center; firewall; malware; virus; warning; windows; crasl
Choose how to check for solutions	Action Center	repair; problem; error; crash; hang; solution; check; for; new; sol
Choose how to report problems	Action Center	analysis; answers; solutions; arounds; workarounds; checking; lo
Fix problems with your computer	Action Center	fix; repair; crash; hang; performance; maintenance; maintain; sol
Review your computer's status and resolve issues	Action Center	healthy; checking; look; for; scanning; verify; restricted; safety; s
View all problem reports	Action Center	reports; tell; microsoft; send; sent; clear; problems; delete; soluti
View archived messages	Action Center	check; for; new; solutions; problems; reports; and; fixed; fixes; fix
View recent messages about your computer	Action Center	warning; report; alert; windows; crash; hang; balloon; reminder;
View recommended actions to keep Windows running smoothly	Action Center	fix; repair; crash; hang; performance; maintenance; maintain; sol
View reliability history	Action Center	repair; problem; error; crash; hang; solution; reliability; monitor;
View solutions to problems	Action Center	check; for; new; solutions; problems; reports; and; fixed; fixes; fix
View the Microsoft error reporting privacy statement online	Action Center	privacy; policy; statement; microsoft; windows; error; reporting;
Windows Activation	Action Center	activate; activation; license; windowsactivation; activatewindow
Administrative Tools (10)		
Create and format hard disk partitions	Administrative ...	check; disk; dsk; chkdsk; cleandisk; cleaner; cleanup; up; add; cre
Defragment and optimize your drives	Administrative ...	check; disk; dsk; chkdsk; cleandisk; cleaner; cleanup; up; defragr
Diagnose your computer's memory problems	Administrative ...	diagnose; diagnostics; diagnosis; find; problems; analyse; analyz
Edit group policy	Administrative ...	adjust; ajust; alter; change; edit; modify; replace; reset; set; switc
Manage computer certificates	Administrative ...	certificate; key
Schedule tasks	Administrative ...	automated; automatically; scheduled; scheduling
Set up iSCSI initiator	Administrative ...	activate; add; begin; enable; intsall; invoke; make; up; setting; se
Set up ODBC data sources	Administrative ...	datum; odbc; data-base; database; activate; add; begin; enable; i
View event logs	Administrative ...	viewer; events; tracker; eventviewer; check; list; see; show; viewir
View local services	Administrative ...	disable; stop; services; activate; add; begin; enable; intsall; invok
AutoPlay (3)		
Change default settings for media or devices	AutoPlay	play; run; start; autoplay; auto-play; autorun; auto-run; autostart
Play CDs or other media automatically	AutoPlay	automated; automatically; play; run; start; autoplay; auto-play; a

This is what the GodMode folder looks like on the inside.



Select which icons and notifications appear on the taskbar

If you choose to hide icons and notifications, you won't be notified about changes or updates. To view hidden icons at any time, click the arrow next to the notification area on the taskbar.

Icons	Behaviors
Action Center Action Center No current issues detected	Show icon and notifications
Network Network 2 Internet access	Show icon and notifications
Volume Digital Audio (S/PDIF): 100%	Show icon and notifications
Dropbox Dropbox 1.6.18 All files up to date	Show icon and notifications
Steam Client Bootstrapper (buildbot_winsl... Steam	Only show notifications
Catalyst Control Center: Host application	Only show notifications
Windows Explorer Safely Remove Hardware and Eject Media	Only show notifications

Turn system icons on or off

Restore default icon behaviors

☐ Always show all icons and notifications on the taskbar

The Notifications folder lets you quickly tweak how Windows and other applications notify you.

Panel folder named CPU. Another cool tidbit Microsoft revealed is the fact that you can use CLSID keys to create a number of useful special-destination folders to take greater control over your overall computing experience.

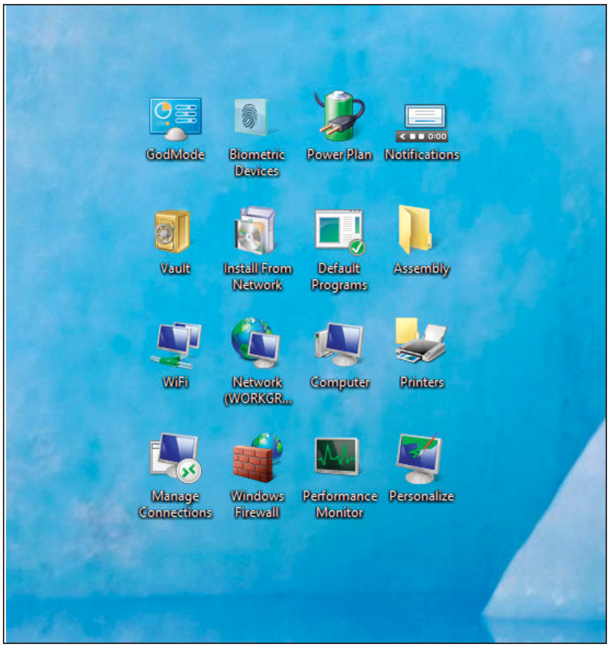
Special-Destination Folders

Although the GodMode folder we describe above is one of the most useful CLSID key folders we found, there are others. For each of the following, simply create a new folder and type the CLSID key exactly as listed, preceded by a name that describes the folder's function (we've suggested some that we think work pretty well) and a period. In the following examples, we'll also mention whether the folder works in Windows 7 or Windows 8. Keep in mind that your mileage may vary with these shortcuts; some may display the full CLSID in the shortcut name, while others only display the name you enter in front of the period.

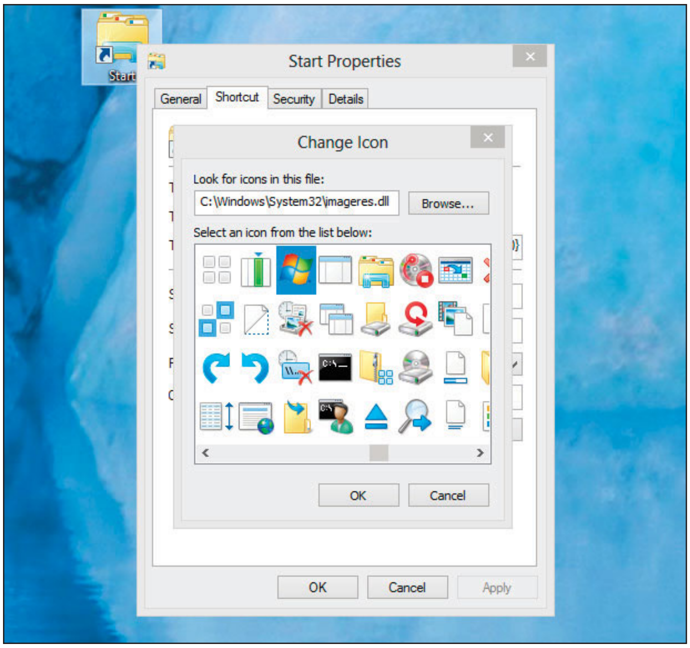
In Windows 7, rename a folder **Default Location.{00C6D95F-329C-409A-81D7-C46C66EA7F33}** and press ENTER to quickly access a setting that lets you change your computer's default location. This setting lets your computer determine where you are located in the absence of a GPS sensor. Input a ZIP Code, select your Country/Region from the drop-down menu, and (optionally) enter your street address. Clicking Apply manually sets your location.

In Windows 7 and 8, create a new folder named **Biometric Devices.{0142E4D0-FB7A-11DC-BA4A-000FFE7AB428}** to quickly access any biometric devices connected to your system.

The Power Plan.{025A5937-A6BE-4686-A844-36FE4BEC8B6D} special-destination folder works in both Windows 7 and 8. It gives you instant access to your computer's power plan selection screen. Use the radio buttons to switch between the Balanced and Power Saver profiles or click the Change Plan Settings hyperlinks to



These are a few of the more useful CLSID keys that we used to make shortcuts on our Desktop.



Look for icons in this file: C:\Windows\System32\imageres.dll

Select an icon from the list below:

This is the icon we chose for our Start shortcut, but there are many more you can choose from.

manually tweak the brightness levels and change the amount of idle time that passes before the screen dims, monitor turns off, and the computer goes to sleep. This special destination folder would be particularly useful for notebooks.

Rename a new folder **Notifications.{05D7B0F4-2121-4EFF-BF6B-ED3F69B894D9}** to create a quick way to modify the notifications that appear in the Taskbar's notifications area. You can scroll down the list to see all applications that are capable of generating notifications and use the drop-down menu on the right to Show Icons And Notifications, Hide Icons And Notifications, or Show Only Notifications. Hyperlinks at the bottom of the control panel also let you turn system icons on or off and restore the notifications to their default settings. This special-destination folder works in both Windows 7 and 8.

To get quick access to a control panel that lets you take greater control over the saved login information for websites, connected applications, and networks, create a new folder and name it **Vault.{1206F5F1-0569-412C-8FEC-3204630DFB70}**. This works in both Windows 7 and 8. From here, you can view passwords, edit credentials, and remove saved accounts.

The **Install From Network.{15EAE92E-F17A-4431-9F28-805E482DAFD4}** special-destination folder works in both Windows 7 and 8 and lets you quickly access a control panel that you can use to install programs from a network location.

Create a **Default Programs.{17CD9488-1228-4B2F-88CE-4298E93E0966}** special-destination folder in either Windows 7 or 8 to get fast access to the settings that determine which programs Windows uses by default for programs, files types, AutoPlay, and much more.

To create what amounts to a shortcut to the Assembly folder (C:\Windows\Assembly), create a new folder in either Windows 7 or 8 and name it **Assembly.{1D2680C9-0E2A-469D-B787-065558BC7D43}**. The Assembly folder contains .NET assemblies that are potentially shared across applications.

Both versions of Windows let you create a special-destination folder named **Wi-Fi.{1FA9085F-25A2-489B-85D4-86326EEDCD87}**. From here, you can manage your computer's detected wireless networks. If there's no Wi-Fi hardware installed on your system, the icon won't launch anything when you double-click it. This is another special-destination folder that notebook users will find handy.

If you want to create a quick shortcut to the File Explorer view of your current network in Windows 7 or 8, create a special-destination folder and name it **Network.{208D2C60-3AEA-1069-A2D7-08002B30309D}**. The name of the network, homegroup, or workgroup appears in parentheses. Interestingly, you can actually name this special-destination folder anything you want, but upon pressing ENTER the folder's name will revert to Network, followed by the network name.

If you type **Computer.{20D04FE0-3AEA-1069-A2D8-08002B30309D}** in the name field of a new folder in Windows 7 and 8, you'll effectively create a File Explorer shortcut to the Computer folder.

To get fast access to the printer management console in Windows 7 or 8, just create a special destination folder using the **Printers.{2227A280-3AEA-1069-A2DE-08002B30309D}** string. From here you can quickly add a printer or manage your default printer using the hyperlinks at the top of the page. Right-clicking any of the installed printers also lets you configure sharing, set up preferences, and more.

Both Windows 7 and Windows 8 let you rename a folder **Manage Connections.{241D7C96-F8BF-4F85-B01F-E2B043341A4B}**. This effectively creates a shortcut to the remote desktop connections control panel. If there are no active remote desktop connections, this control panel will be empty.

The **Windows Firewall.{4026492F-2F69-46B8-B9BF-5654FC07E423}** special-destination folder works in both Win7 and Win8. As you'd expect, double-clicking the folder takes you to the Windows Firewall control panel, where you can perform all of the familiar WF functions you know and love.

To quickly check your Windows Experience Index in Windows 7 or Win8, create a new folder and name it **Windows Experience Index.{78F3955E-3B90-4184-BD14-5397C15F1EFC}**. This special destination folder is a dumbed-down way to determine which of your hardware components might be ready for an upgrade. But if you're reading CPU, you probably already know your bottlenecks better than the WEI does.

Want to quickly tweak the Desktop backgrounds, themes, colors, sounds, and screensaver on your Windows 7 or 8 computer? Just create a new folder and name it **Personalize.{ED834ED6-4B5A-4BFE-8F11-A626DCB6A921}**. This folder takes you to the same places as does right-clicking on the Desktop and clicking Personalize. ■

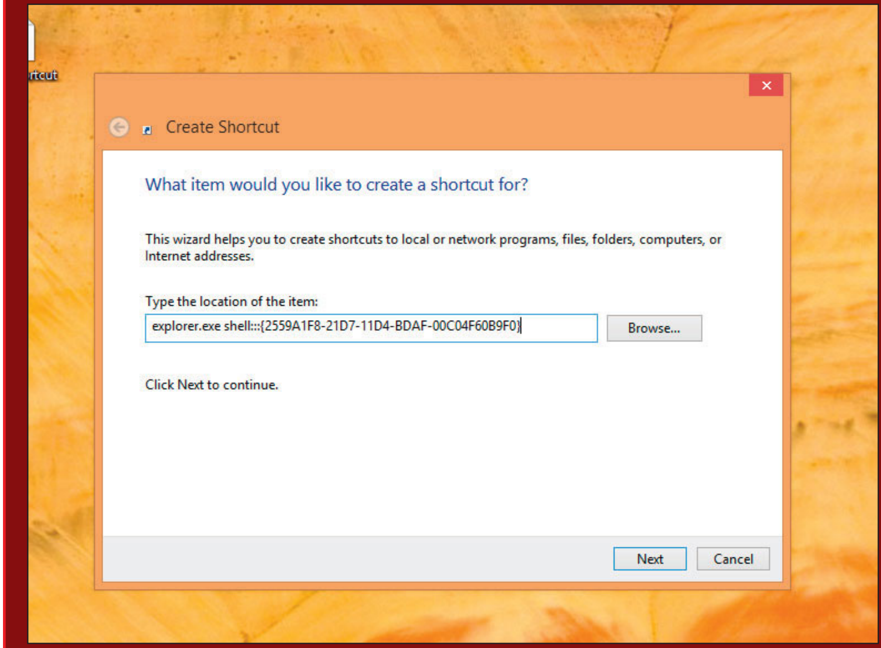
WINDOWS TIP OF THE MONTH:

The DIY Start Button

As we've shown you, CLSID keys are handy things. In this issue's WTOTM, we'll show you how to use one to effectively recreate a Start button in Windows 8. The procedure here is a little different than described above, however; you need to launch it using a shell command. Start by right-clicking anywhere on the Desktop and clicking New, Shortcut. In the Type The Location Of The Item field, type **explorer.exe shell:::{2559A1F8-21D7-11D4-BDAF-00C04F60B9F0}** and then click Next. In the Name field, replace explorer.exe with **Start**, and then click Finish.

Go ahead, double-click the folder to see the Apps screen that comes up when you press WINDOWS KEY-Q. But to make this shortcut a little handier, we'll want to change its icon and put it in its familiar place. Start by right-clicking the new shortcut and clicking Properties. Click Change Icon, click Browse, navigate to C:\Windows\System32\imageres.dll, and then click Open. Scroll through the icons until you find the classic Windows icon and click OK. Other good icon repositories in the System32 folder include Shell32.dll, Moreicons.dll, Pifmgr.dll, Netshell.dll, DDORes.dll, GameUx.dll, Setupapi.dll, and Wmploc.dll. Of course, nothing is stopping you from manufacturing your own or downloading one you like from the web. Just put it somewhere that's not likely to move and navigate to it from the shortcut's Properties screen. Click Apply and then OK on the Properties dialog box to close it.

Now that the icon looks nice, let's pin it to the Taskbar by right-clicking it and clicking Pin To Taskbar. Drag it all the way to the left corner of the taskbar. You can also pin it to Start by right-clicking the shortcut and choosing the appropriate option from the drop-down menu.



What item would you like to create a shortcut for?

This wizard helps you to create shortcuts to local or network programs, files, folders, computers, or Internet addresses.

Type the location of the item:

```
explorer.exe shell:::{2559A1F8-21D7-11D4-BDAF-00C04F60B9F0}
```

Click Next to continue.

Make sure you copy the shell command exactly as it is here or the shortcut won't work.

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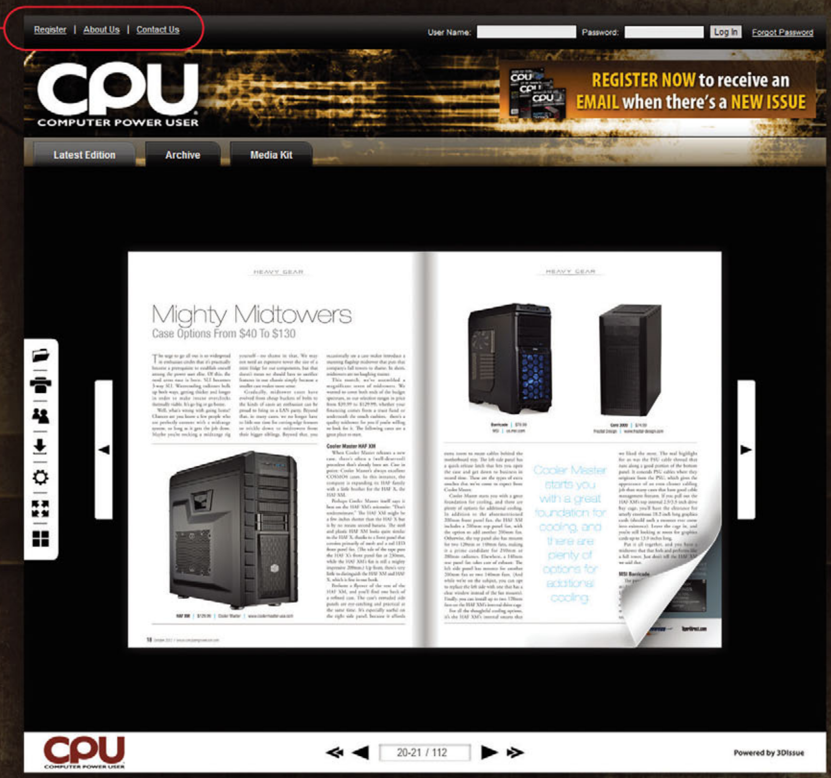
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The Free-To-Play Revolution

Freemium Makes Its Move

The world of online gaming has changed, thanks to the rise of always-connected mobile devices, social gamers, and a generation of people growing up playing free games on the Web. Where once you'd pay a monthly subscription to play an online game (that included all of the levels, weapons, and encounters available), many game developers, including the big-name studios, now embrace the free-to-play, or "freemium," model for many new titles. This requires a change to the game mechanics, so companies can monetize games through advertising or upselling premium content.

League of Legends is a free-to-play MOBA that's currently one of the most popular games in the world.

An Audience Change

"Gaming has now extended beyond the traditional hardcore audience (typically 18- to 32-year-old males) to the mass market," says Tuong Nguyen, principal analyst, Consumer Technology and Markets for Gartner. "It includes moms, dads, grandparents, and women—basically people who weren't considered gamers before. These are more casual players. As such, they aren't willing to spend $50 on a game like hardcore players. This is where the F2P (free-to-play) model comes in. It caters to the mass gaming market." The social aspect of both F2P and subscription games has also helped to expand the gamer audience, because people are more likely to try a game if their friends and family are also playing.

Lewis Ward, research manager for gaming at IDC, tells us, "The F2P model reduces the barrier to entry as games go digital, because people can experience the game at low risk. Therefore, developers are getting free marketing (in a way), as well as viral uptake when friends, family, and others may be playing the game. As such, it's a relatively efficient means in a digital distribution environment to get games out there. You'll get a lot of eyeballs looking at it."

A recent Parks Associates study, titled "Online Gaming And Digital Distribution," stated that 56 million people played at least one hour of games per month in 2008. By 2011, that number jumped to 135 million. Parks Associates indicates that many of the new gamers were attracted to social, F2P online games. The ability to digitally distribute games, as well as the greater opportunity to play via tablets and smartphones, have changed the gaming market from one where you'd buy a title at a retail store to one where the game is a service provided to you.

What Will You Pay For?

Free games find other ways to make money. Just a few examples of monetization include microtransactions for new characters and weapons, extra currency, and other perks; the ability to upgrade to a full-featured paid version; and in-game advertising. These types of transactions require a delicate balance for game developers, as they can't nickel-and-dime users but neither can they give away all the premium elements of the online experience. The gameplay mechanics must be implemented in such a fashion that players will pay for things along the way, all without turning them off from the game.

"You're more likely to see consumable items, user customization, and time-saving mechanisms with F2P," Ward says. "You're going to see more episodic gaming, such as paying a given amount of the first third of the game, and if you like it, you'll pay for the next part." In some cases, the add-on content is merely superficial, so gamers can actually enjoy the same experience others have, just without the alternative cosmetic look or customization items.

In other online titles, gamers can pay for items or XP that will make gameplay easier. Generally, these are items that you could find or earn later on; you just don't have to grind through the game to enjoy them. These types of transactions occurr in some subscription games too, as people will buy characters that others had done the work to level up, but in F2P, the money goes to the developer. Add-ons that give one player a distinct advantage over another are the most controversial, because they skew the balance of the game to those who are willing and able to invest more money into the game.

Some mechanics are more straightforward than others, as a game may be F2P up until a given level. Developers anticipate that once you reach that stage you've played long enough to have a vested interest and will pay a fee to enjoy the next set of levels or the rest of the game. Apps on tablets and smartphones handle in-game purchases in a similar way, as you'll find that most lobby you to pay for a premium version, virtual goods, or extra features at some point.

Ward says, "There's also the advertising business model. It's a little bit different from a tablet perspective (vs. a PC gaming experience), as you'll see a lot of interstitial ads that you don't typically see in a Facebook or PC game. It basically allows some combination of microtransactions with virtual items, as well as advertising, which could be a banner or interstitial ad."

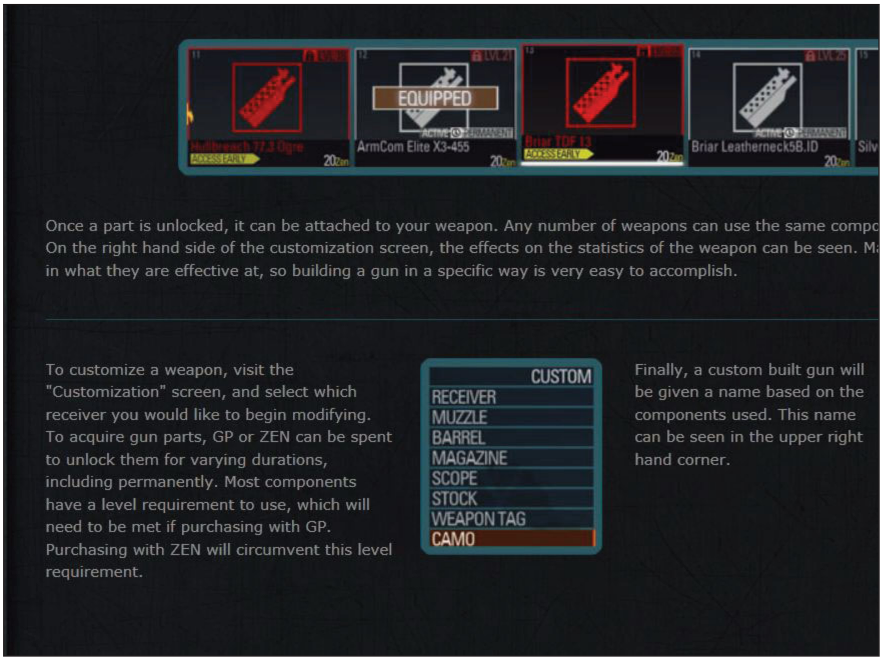
Pros & Cons

With F2P, many gamers question whether developers can maintain the same standards for storyline, animation quality, and user progression that were found in the subscription and full retail models. On the flip side, some gamers argue that the F2P model lets them test a game to see if it offers enough of a compelling experience to make it worthwhile. As such, gamers can do more than play through a brief demo before they plop down any cash. Because you have nothing invested, there's nothing to keep you from uninstalling the game.

"The flexibility and accessibility make F2P extremely appealing across all market segments," Nguyen said. "Subscription brings a financial barrier

EA's Battlefield Heroes is a cartoon-style third-person shooter where you work with teammates.

In World of Tanks, you can pick your tank and freely jump into the battle.



Once a part is unlocked, it can be attached to your weapon. Any number of weapons can use the same compo
On the right hand side of the customization screen, the effects on the statistics of the weapon can be seen. M
in what they are effective at, so building a gun in a specific way is very easy to accomplish.

To customize a weapon, visit the "Customization" screen, and select which receiver you would like to begin modifying. To acquire gun parts, GP or ZEN can be spent to unlock them for varying durations, including permanently. Most components have a level requirement to use, which will need to be met if purchasing with GP. Purchasing with ZEN will circumvent this level requirement.

Finally, a custom built gun will be given a name based on the components used. This name can be seen in the upper right hand corner.

The FPS Blacklight Retribution lets you customize weapons with virtual money.

of entry in two ways. You have to have the funds to continue to play, [which can adversely affect] students, young people, and other financially strapped individuals. In many instances, you need a credit card. Not everyone does. This is truer in emerging markets where credit is not as common as in the United States."

One of the biggest changes for game developers regarding F2P is how the game is supported and developed. With a traditional offline game and some subscription models, most everything was done before the release, so there wasn't an extensive need to support players after they've downloaded the game. With the F2P model, people must be continually engaged to play the same game, because that's how developers can monetize extra content. That means you'll enjoy things like new characters, weapons, and storylines that might not have been finished or thought of during the initial release.

It also means that the games themselves are continually changing. For example, a strategy that may have worked well a month ago may not be wise choice now, because the developers have balanced a mechanic that was too powerful or lacking previously.

F2P Expands

"The rise of smartphones and tablets has promoted developers to target the F2P method on both PCs and Macs, as well as what they've done on Android and iOS," Ward says. "They've essentially had to rethink what types of games they should make and how they should be monetized. That leads them down the path of simpler, often 2D games that have a social element to them, so they can get the viral uptake.

"I think that the rising number of eyeballs across the screens has caused all the major developers to think about their best avenue for making money in the future. And if they aren't thinking about the smaller touchscreen aspects, they certainly ought to be."

Many popular MMORPG (massively multiplayer online role-playing game) and MOBA (multiplayer online battle arena) games now use the F2P business model, though it hasn't taken over the market as quickly as it did with mobile games. IDC does a monthly comparison of online PC games, and the findings have shown a definite trend toward the F2P, in terms of revenue.

Star Wars: The Old Republic recently moved to the free-to-play model.

Lewis says, “We do look at monthly ARPPU (average revenue per paying user), which of course would only be a share that gamers do pay each month. What we’ve seen is that in 2012, the subscription model and the freemium business models were tied at about $8.75 a month. In 2013, the subscription model dipped to $8.35, with freemium rising to $8.95 a month. There’s really been a sea change, where the actual ARPPU of the freemium business model has surpassed subscriptions—with both being much higher than the prepaid full game model.”

Mobile Gaming

One of the key improvements to the mobile gaming market has been the continued evolution of display technology for smartphones and tablets. Gartner’s recent “Market Trends: Mobile Gaming Monetization” report indicates that “game developers have taken advantage of better hardware, such as faster processors and better displays, and growing interest from semi-hardcore (midcore) gamers, and provided a graphically rich, more engaging and complex mobile games.” Some of these games offer an experience that’s similar to what you’ll enjoy on the PC and console.

The social aspects of tablets and smartphones are also idea for the F2P model, as it’s great for promoting competition among friends. For this reason, you’ll find that the most popular mobile games are ones that people have been playing in an analog way for a long time. Ward says that “from a revenue perspective on tablets, casino games, such as poker, bingo, and slot machine titles, have been a big success. You’ll also find some action-adventure titles, as well as casually oriented genres, such as puzzles, parlor board, and quiz games, that tend to do better financially.”

A Free Future

By lowering one of the biggest barriers to gaming, the F2P model has changed the industry. The F2P model looks to be cemented in the casual gaming market, where people prefer to pay only small fees for games and content because they don’t play that often. Freemium is just beginning to take root in the realm of hardcore gamers, who may find that buying quests, gear, XP boosts, and other things may end up more costly than a one-time or monthly charge.

Of course, the risk of the F2P model is that continuous prompts to “buy more” in order to continue could eventually turn off gamers, so it’ll be up to the game developers to create game mechanics that will be keep them coming back for more. In a few years, we should know if F2P will succeed subscription for good, or if it’s merely a fad. ■

[SPACE] Switch Camera Mode
[MOUSE1] Cycle Targets (fwd)
[MOUSE2] Cycle Targets (rev)
0:53
Setup
Map: cp_gravelpit
Press [.] to Change Team
vasyazmei
C
A
B

Player Installer joined team Blue
Player JAROST joined team Blue
Player ABC joined team Red
Player Jackal joined team Blue
Player [illegible] joined team Blue
Player Take joined team Blue
Player -=SAS=- joined team Red
Player hrs.021 » T.ns joined team Blue
Player Snap left the game (Disconnect by user.)

Tip: As a Pyro, switch to your shotgun if enemies retreat beyond the short range of your flamethrower.

The classic Team Fortress 2 is now free-to-play.

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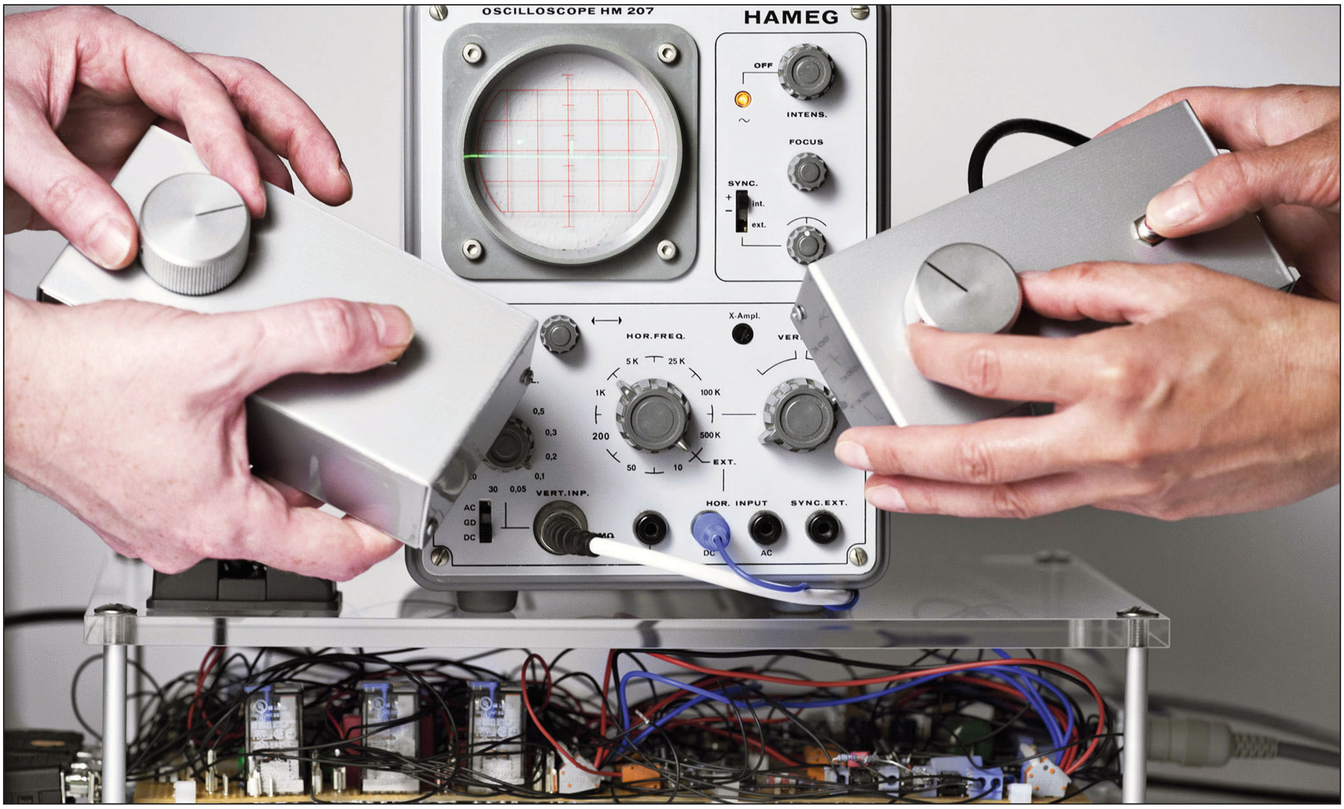
The History Of The World (Of PC Gaming): Part I

Here at *CPU* magazine, we've long known that gamers and hardware enthusiasts are often one in the same. No, not every hardware enthusiast is a gamer, but even those who are largely uninterested in WoW, Diablo, Minecraft, or Doom have to admit that videogames are one of the core driving forces behind technology's unrelenting advance. Faster processors, more muscular GPUs, overclocked RAM, and everything else that go into making a capable modern PC also happen to make an appreciable difference in your overall gaming experience. And that's no coincidence.

Take a look at *CPU*'s own system benchmark suite, for example. Both the synthetic and real-world benchmarks rely heavily on games and graphical rendering techniques to help us quantify a system's performance. Aside from the actual games we use to test systems, PCMark, 3DMark, Cinebench, POV-Ray, and Unigine Heaven all include game-relevant workloads designed to push the system to its operational limits. The reason games are so effective at taxing systems is because it takes a lot of raw compute to re-create the world as our eyes see it and our brains render it, even if only vaguely. Arguably, one of gaming's ultimate ideals is to create a simulation that is utterly indistinguishable from the real world. We may not get there in our lifetime, but we're a lot closer to achieving that goal than we were when we started.

Also consider that the general-purpose workhorse of the PC, processors from AMD and Intel, both feature built-in instruction sets designed specifically to improve PC gaming. With the addition of MMX, 3DNow!, and Streaming SIMD Extensions, both firms acknowledged the gaming and entertainment aspect



Tennis For Two let two players compete with one another.

of the personal computer as a core business concern.

In the following pages of this first of a two-part article, we'll bring along an infinitely large backpack full of torches to illuminate the subject of gaming from its humble origins, through the rise of the console, and the rise of the PC as the gamer's machine of choice. In part two, we'll trace some of PC gaming's high (and low) points. We'll pierce the fog of war, push the draw distance as far as it will go, and speculate on future of the PC gaming industry on the not yet fully rendered horizon.

Pre-PC Gaming

The attempt to create interactive experiences with electronics predates the personal computer by quite a bit. Although many of these highlights don't classify as computers by any stretch of the imagination, they all helped set the stage for PC gaming as we know it. Another important thing to note about these early gaming devices is that they are largely single-function, capable of playing just one game. Many early games were also programs run on precursor computers, but these weren't exactly renaissance devices, their primary functions were performing scientific calculations.

In 1947, a pair of inventors named Thomas T. Goldsmith, Jr. and Estle Ray Mann built what many believe to be the first videogame. Using analog electronics plugged into a cathode ray tube, the pair created a rudimentary radar-assisted missile firing simulator. The device, called the Cathode Ray Tube Amusement Device, could only render a CRT beam as a single dot, so players needed to place a grid overlay on the CRT and use the dials to move the dot across the grid. When positioned over an enemy target, players would press a button; a direct hit was signified by the beam defocusing. Sadly for gamers of the era, the Cathode Ray Tube Amusement Device was never released to the public.

The same year, Alan Turing, a British mathematician who is considered the father of computer science and artificial intelligence, theorized a chess-playing program to demonstrate machine intelligence. The program was executed on Manchester University's Ferranti Mark I, which was one of the earliest stored-program computers. Deep Blue it wasn't; the program could only compute the final handful of moves, not a whole game. Incidentally, Turing proposed his test for determining if a computer could be called intelligent around this time. It states roughly that a computer can be said to think if it is capable of holding a conversation convincingly enough to fool a human into thinking he/she is conversing with another human.

In 1951, Ferranti, a UK electrical engineering and equipment firm, created NIMROD, a special-purpose computer designed to play the game NIM. To play the game, two players take turns removing one or more tokens from one of multiple piles. The game ends with the final player taking the last token from the last pile. NIMROD used lighted panels to show the player the progress. The original device weighed over a ton.

Alexander S. Douglas created OXO, or Noughts and Crosses, in 1952; it was the first computer game to employ a digital graphical display. The game was essentially a version of tic-tac-toe, and Douglas ran it on the University of Cambridge's EDSAC (Electronic Delay Storage Automatic Calculator) computer. Interestingly, the game used a rotary telephone controller.

The same year, at the UK-based National Physical Laboratory, Christopher Strachey developed a simulation of the game draughts, known as checkers in the United States, and executed it on the Pilot ACE (Automatic Computing Engine), which was a stored-program computer based on an Alan Turing design. The Pilot ACE used approximately 800 vacuum tubes.

> Between 1957 and 1961, the team created two light-pen-based games, Mouse In The Maze and Tic-Tac-Toe. In the former game, player could draw maze walls on a 12-inch oscilloscope display, drop dots that signified cheese, and then release a virtual mouse that would hunt down and consume the dots.

Spacewar! was very influential for early game developers.

Its main memory consisted of mercury delay lines, and it was initially capable of handling 128 32-bit words, later expanded to 352 words, then 4,096 words thanks to a drum memory upgrade in 1954. Its basic clock rate was 1MHz. To capitalize on the success of the machine, the English Electric Company manufactured a commercial version of the Pilot ACE, called The DEUCE.

In 1958, one of the first two-player interactive games was funded by the U.S. Department of Energy and created for the Brookhaven National Laboratory's annual visitor's day. Tennis For Two was the brainchild of William Higinbotham; he built it in two weeks using an analog computer, the vector display system of an oscilloscope, and a pair of handheld controllers. It was meant to promote atomic power and, according to Higinbotham, "liven up the place." Tennis For Two

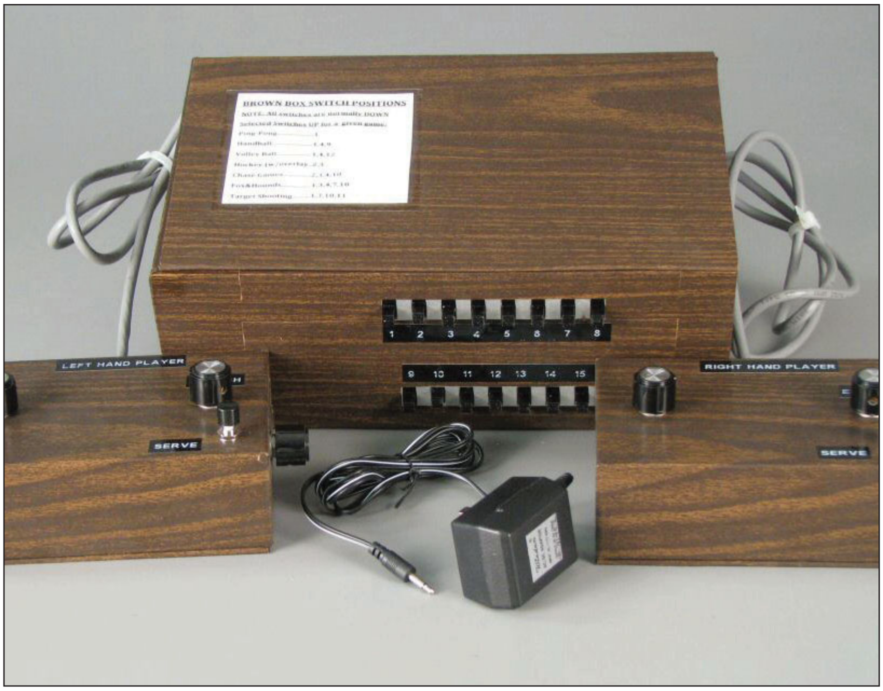
> Ralph Baer's Brown Box, the final of seven prototypes completed in 1968, was one of the earliest pieces of hardware that would go on to allow home users to play games on a standard television.

can't claim to be the first videogame, but it was certainly one of the first games made publicly available to play. In 2008, the Brookhaven National Laboratory rebuilt Tennis For Two to commemorate the game's 50th anniversary. During the public event, the analog computer running it blew an oscillator chip. Just 25 minutes later, a new chip had been soldered in place and the gaming continued. (In an unrelated note, the U.S. Department of Energy would cringe 39 years later when Interplay's Fallout series debuted.)

Not to be outdone in the world of computers, researchers at MIT created a handful of games that could be run on the institution's experimental TX-0 (Transistorized Experimental computer zero, pronounced "tix-oh"). Between 1957 and 1961, the team created two light-pen-based games, Mouse In The Maze and Tic-Tac-Toe. In the former game, player could draw maze walls on a 12-inch oscilloscope display, drop dots that signified cheese, and then release a virtual mouse that would hunt down and consume the dots. MIT's TX-0 was a fully transistorized 16-bit computer that used magnetic core memory to handle 64,000 18-bit words, which was a remarkable number at the time.

In 1961, a trio of MIT students, Martin Graetz, Steve Russell, and Wayne Wiitanen, conceived Spacewar!. The following year, they had it running on a DEC (Digital Equipment Corporation) PDP-1 (Programmed Data Processor-1) minicomputer hooked up to a vector display system. The game, often referred to as one of the earliest shooters, allowed two players to control spaceships, each tasked with destroying the other. A centrally located star pulled both ships toward itself, forcing the players to constantly maneuver around it to avoid collision. Apparently Spacewar! was the Crysis of the early Sixties; the game was capable of stressing all aspects of the system and as a result, DEC supposedly used Spacewar! to burn-in its systems before shipping them. The PDP-1 minicomputer was only about as large as a Volkswagen Beetle.

The PDP-1 was considered compact for its era.



Ralph Baer's Brown Box was a kind of prototype for the Magnavox Odyssey.

Pong started out in arcade units, but enjoyed success on consoles, as well.

The Rise Of Arcades & Consoles

By the late '60s and early '70s, the idea of playing interactive games on video displays was spreading, and many innovations occurred within a relatively short span. For game lovers, this is the period when gaming became something anyone could do, relatively inexpensively, either at a local bar or restaurant, or more expensively, in their homes.

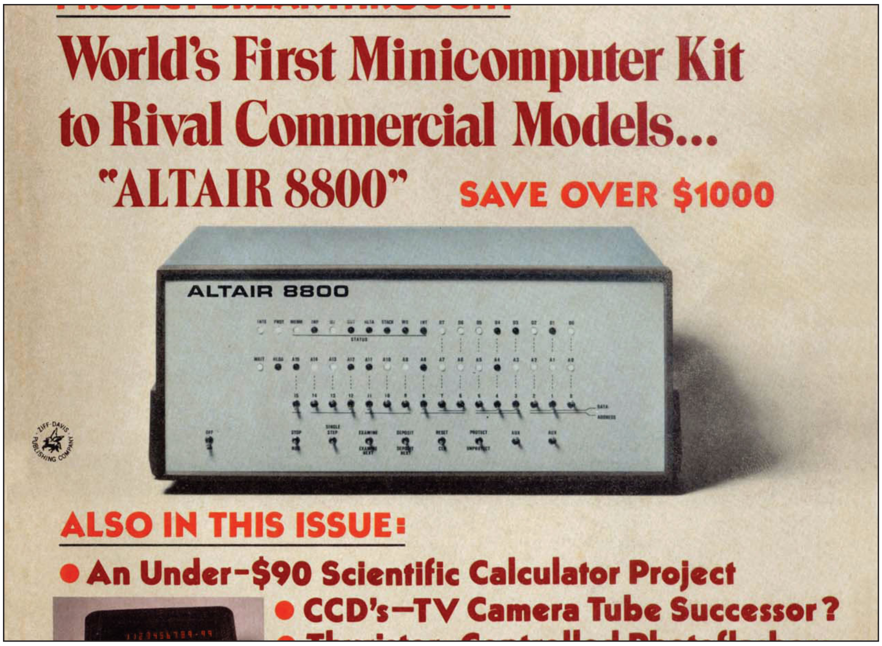
Ralph Baer's Brown Box, the final of seven prototypes completed in 1968, was one of the earliest pieces of hardware that would go on to allow home users to play games on a standard television. The unit consisted of a central box that housed the main circuitry, two controllers with dials that enabled two players to interact with one another, and a light gun. Baer demonstrated the system's ball and paddle games, target shooting games, and others to an electronics manufacturer, Magnavox. They struck a deal, and in May of 1972, the Magnavox Odyssey went on sale in the United States, becoming the first home videogame system.

The Odyssey used cartridges, but instead of housing logic and programs, the carts actually acted as jumpers, disabling and enabling circuits to alter game play. Screen overlays were also used to change the games. The Odyssey sold 100,000 units the first year it was available and 2 million units by the end of its life span.

In 1971, Bill Pitts and Hugh Tuck used Stanford University's DEC PDP-11/20 computer to create Galaxy Game, the first coin-operated computer game. Later that year, Nolan Bushnell and Ted Dabney launched Computer Space, the first coin-operated videogame to be sold commercially. Nutting Associates purchased the game and manufactured 1,500 Computer Space machines, launching them in November 1971. Both Galaxy Game and Computer Space were inspired by Graetz, Russell, and Wiitanen's Spacewar!.

A year later, based on the programming work of Allan Alcorn, Bushnell and Dabney released Pong. The first Pong installation was in a Sunnyvale, Calif. tavern called Andy Capp's. The machine broke just a few days after it was installed, but when the team arrived to fix it, there was a line of eager patrons with pockets full

In 1977, early consoles and a proliferation of Pong clones had saturated the market. A variety of console makers folded and sold their stocks at a loss to exit the market, leaving just Atari and Magnavox left standing.



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The Jan. 1975 issue of Popular Electronics introduced the world of electronics hobbyists to the Altair 8800.

of coins, waiting for the establishment to open. Apparently, the malfunction was the result of too many coins being jammed into the mechanism. The top-down table tennis simulator went on to become one of the most popular videogames of the period, and has since achieved pop culture icon status. Bushnell and Dabney formed Atari in 1972 to develop and sell their coin-op units and managed to sell more than 19,000 Pong machines. Pong's runaway success also ultimately led to the videogame crash of '77, but we'll get to that later.

In 1975, Tomohiro Nishikado designed a game called Gun Fight, which was a shooter that players controlled using dual-stick controls. The game was also unique for its depiction of human-to-human combat. Dave Nutting adapted Intel's venerable 8080 to run the game in U.S. arcade units, making it the first game to run on a microprocessor. In 1978, Nishikado used a microprocessor for his ground-breaking Space Invaders game.

Dave Nutting, under contract with Bally Manufacturing Corporation, was able to obtain one of Intel's early microprocessor development kits. Nutting together with his partner Jeff Frederiksen developed the first microprocessor-based pinball machine, Flicker. Soon afterward, the industry ceased using electromechanical machines, and Bally essentially took over.

In 1977, early consoles and a proliferation of Pong clones had saturated the market. A variety of console makers folded and sold their stocks at a loss to exit the market, leaving just Atari and Magnavox left standing. Even though they remained in the business, both companies reported losses for 1977 and 1978.

Atari launched its VCS (Video Computer System), later renamed the Atari 2600, in 1977. Unlike previous consoles which used overlays and jumper-like cartridges, the Atari 2600 used programmable cartridges, and nine of them were available in its launch window. The console really took off when Nishikado's Space Invaders was ported to it. The Atari 2600 featured an 8-bit 6507 CPU, 128 bytes of RAM, and up to 4KB of ROM in each cartridge.

PC Gaming Is Born

As the home console market was reinventing itself and the arcade industry was booming on the success of Space Invaders, another outlet for games was emerging as programs run on home computers.

In 1975, the Altair 8800 wasn't the first single-ship microprocessor-based computer to be made available, but it became widely popular for being relatively easy to use and inexpensive. It came as a kit that cost $400 and included an Intel 8080 microprocessor. The Altair 8800 was released to a large and rapidly growing audience of budding enthusiasts that had been looking for something to tinker with. The Altair 8800 was also modular, letting consumers purchase upgrades to the memory board, parallel and serial interface boards, paper tape reader for storage, additional RAM cards, and a Teletype terminal.

The Altair 8800's other killer feature was that it was programmable. Users could toggle switches that corresponded to the Intel microprocessor instruction in binary, load the code into memory using an enter switch, and then enter the next bit of code until the full program was loaded into memory.

Although laborious, programming the Altair 8800 spawned groups that traded programs, tips, and advice. One of these early groups was the Silicon Valley-based Homebrew Computer Club. Their collaboration gave voice to the desire for a computer that was useful, programmable, and ready to use out of the box. The time was right for an all-in-one personal computer to come along and take home gaming to new levels. As it happens, there were three of them in 1977. We'll continue to explore the evolution of the platform in part two, next month. ■

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05.18-20.13

BaseLAN 25 - Winnipeg, Manitoba
allyourbaseonline.com/ca

05.18.13

WV Gamers - Eugene, OR
www.wvgamers.com

NGC's LAN-A-GEDDON - Greenville, TX
www.networkgamingclub.com

Oklahoma Gamers Group
Oklahoma City, OK
www.okgg.org

Forbidden Guild Spring Mayhem LAN
West Strathroy ON Canada
www.forbiddenguild.com

Nexus LAN - Miamisburg, OH
www.nexuslan.org

05.25-26.13

Civil War LAN 5 - Corvallis, OR
gaming.oregonstate.edu

05.31-06.02.13

LANFest InfernaLAN Spring 2013
Dupont, WA
lanfest.intel.com

05.31.13

Maryland LAN Gamers - Maryland
www.marylandlangamers.net

06.01-02.13

LANified! 14: Phoenix Rising - Calgary, Alberta
www.lanified.com

06.07-09.13

GNWLAN: LANapalooza - Vancouver, WA
gnwlan.com

06.14-15.13

Fort LAN - Fort Wayne, IN
www.fortlan.org

06.14.13

Video Game Fanfest - Alexandria, VA
www.videogamefanfest.com

06.15.13

WV Gamers - Eugene, OR
www.wvgamers.com

NGC's LAN-A-GEDDON - Greenville, TX
www.networkgamingclub.com

Oklahoma Gamers Group
Oklahoma City, OK
www.okgg.org

06.22.13

Naois Gaming - York, PA
www.naoisgaming.com

MeltDown 2013 - Redding, CA
2013meltdown-cpu.eventbrite.com

07.12-15.13

PDXLAN 22 - Portland, OR
www.pdxlan.net

07.12-14.13

LANFest MLP'013 Summer
Hamburg, NY
lanfest.intel.com

07.12.13

SWVA Gaming: PnP.3 - Lebanon, VA
www.swvagaming.com

07.19-21.13

LANFest Atlanta Summer 2013 - Atlanta, GA
lanfest.intel.com

07.20.13

NGC's LAN-A-GEDDON - Greenville, TX
www.networkgamingclub.com

Across The Nation—& Beyond!

Oklahoma Gamers Group - Oklahoma City, OK
www.okgg.org

08.01-04.13

QuakeCon 2013 - Dallas, TX
www.quakecon.org

08.10.13

WV Gamers - Eugene, OR
www.wvgamers.com

08.17.13

Oklahoma Gamers Group - Oklahoma City, OK
www.okgg.org

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www.networkgamingclub.com

AWOL LAN 22 - Eau Claire, WI
www.awollan.com

09.06-08.13

Exile LAN XIII - Troy, NY
exilelan.com

09.06.13

Maryland LAN Gamers - Maryland
www.marylandlangamers.net

09.07.13

LAN OC V13.0 - Ohio City, OH
lanoc.org

09.14.13

SWVA Gaming: VII - Lebanon, VA
www.swvagaming.com

09.21.13

Oklahoma Gamers Group - Oklahoma City, OK
www.okgg.org

WV Gamers - Eugene, OR
www.wvgamers.com

NGC's LAN-A-GEDDON - Greenville, TX
www.networkgamingclub.com

09.27-29.13

GNWLAN 10 - Vancouver, WA
gnwlan.com

10.18-20.13

Naois Gaming - York, PA
www.naoisgaming.com

10.19.13

Oklahoma Gamers Group - Oklahoma City, OK
www.okgg.org

WV Gamers - Eugene, OR
www.wvgamers.com

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Q&A With Cooler Master Product Line Manager Carter Salley

CM Storm Turns 5

Q Cooler Master's CM Storm brand has come a long way since its launch nearly five years ago, growing to include some of the best cases, keyboards, and mice on the market. Can you tell us a little about how the CM Storm brand came to be and the philosophy behind CM Storm products?

CS After seeing massive growth in desktop components (cooling, cases, and power supplies), Cooler Master looked at diversifying its brand. Due to major growth in the PC gaming sector, our history of powering higher-end system builds, and our relationship with the modding community, high-end peripherals seemed like a natural fit. We were already receiving feedback from customers that they wanted their systems to have a more complete and matching look. Utilizing our strength in design and product development, we sought to make the best peripherals available.

The philosophy behind CM Storm is simple: No two users are the same, so we want to provide each one with a wealth of options that feature the best available technologies and are designed to meet every need. Want a great mechanical keyboard? Choose the size and Cherry MX keyswitch type that best fits your style and is most comfortable for you. Need an optical or laser mouse? We'll provide the best sensors available, and you select the grip type that fits best. We follow through on that philosophy with our headsets and gaming surfaces, as well.

Q Cooler Master recently announced the launch of the CM Storm QuickFire Stealth. [*ED: See our review in this month's keyboard roundup.*] Take us behind the scenes on the design, if you would: How did you decide to put key labels on the front of the keys instead of on top?

CS We wanted to create a conversation piece, something that upon first glance would make people do a double take. So we took our most popular board, improved upon the design, and gave it a unique and innovative look that also provides real-world functionality. The QuickFire Stealth's unique keycaps—where icons and letters are printed on the front side rather than on top—represent its defining characteristic and create an incredibly sleek, clean, and stylish look. More importantly, front-printed keys also provide a longer life span over normal keycaps because there is no finger friction or natural oils to wear away the print, resulting in an extremely durable product.

Q What else can you tell us about the QuickFire Stealth?

CS The biggest benefit of a mechanical keyboard is responsiveness, so it has built upon the great features of the QuickFire Rapid by including adjustable repeat rates, allowing users to issue commands faster and type more efficiently. In RTS games, for example, many commands can be executed by pressing a single key, so a higher repeat rate means commands can be issued faster, giving you an edge while putting less strain on your wrist and fingers.

Q We really liked the CM Storm Scout 2 midtower case when we reviewed it last November. Now there is a new variant, the Scout 2 Advanced. How does this model differ from the original Scout 2?

CS CM Storm is a brand dedicated to providing users with the utmost choice and flexibility, and the Scout 2 is no exception. Our more recent Advanced models complement the basic Scout 2 model in that they offer users different colors or more cooling to fit their individual preferences and builds.

Q Cooler Master recently added a number of gaming surfaces (mousepads) to the CM Storm product lineup, including the Control-RX, Power-RX, and Speed-RX. What can you tell readers about these and the other surfaces in your lineup?

CS Our gaming mice use some of the most advanced sensor technology available, and our surfaces are engineered to take advantage of the pinpoint precision and highly responsive tracking they provide.

Each model of the RX series has its own unique surface type, base type, and thickness. For example, the Control-RX uses a soft Lycra material and is 5mm thick, while the Power-RX uses a hybrid rubberized cloth material and is 2.5mm thick. It all boils down to what you need. ■

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